FOOD INDUSTRIES

MAY 1939

HOMES OF FAMOUS FOODS... WILSON MEAT PRODUCTS, CHICAGO, ILL.

IN THIS ISSUE: Food at the World's Fair
Packages and Public Relations

McGRAW-HILL PUBLISHING COMPANY, INC.

Field Report on:

ALUMINUM BODY CARRYING 2 TONS EXTRA PAYLOAD

with savings on license, gasoline, tires!

★

The Val Decker PACKING COMPANY

ESTABLISHED 1873

BEEF AND PORK PACKERS — SAUSAGE MANUFACTURERS

U. S. INSPECTION EST. NO. 95

DECKER'S PIQUALITY BRAND HAMS, BACON AND LARD

PIQUA, OHIO

February 7, 1939

Mr. Ray Coblentz
Superior Auto Body Company, Inc.
16 Spague Street
Dayton, Ohio

Dear Ray:

The semi-trailer, all aluminum refrigerator truck body which you built for us has been in operation just one year. We are so well pleased with the operating statement of this outfit that we desire to give you our experience regarding it.

You will remember that this all aluminum body replaced a wood frame, sheet metal, and cork insulated body on Fruehauf semi-trailer. This trailer equipped with the old body weighed 12,110# while the same trailer with this new body only weighs 7,460#, a saving of 4,650#. This weight savings reduced the license cost approximately $94.00. This new body being eight inches wider than the job which it replaced has permitted us to carry approximately 2 ton more pay load per trip. Even with this larger pay load, for the year we average 526 more miles per gallon of gasoline than with the old body. Also we had approximately 15% saving on tires. Not only have we had a savings in license, gasoline, and on tire cost but the aluminum insulation afforded more efficient refrigeration and at all times our customers receive all fresh meat in the same good condition as when it left our coolers.

Last but not least, the aluminum tread floor and aluminum corrugated side walls make this truck very easy to clean, consequently the labor cost of cleaning has also been reduced considerably.

Summing the above, we are so well pleased with this equipment that all future refrigerator bodies will be built strictly all aluminum and aluminum insulation. We do not hesitate in recommending this all aluminum body to anyone interested in low delivery cost.

Yours very truly,

THE VAL DECKER PACKING COMPANY

Walter O. Decker
Secretary

This is the unit described in the letter.

(This is another advertisement based on reports from our engineers in the field, detailing the experience of truck operators who are now using bodies or trailers constructed of Alcoa Aluminum. Facts are obtained directly from the operator.)

THIS letter from The Val Decker Packing Company tells another typical story about a semi-trailer built of Alcoa Aluminum Alloys. It's worth reading, but if you're in a hurry these facts are salient:

1. Weight saved by using Aluminum: 4650 lbs.
2. Extra payload: Approximately 2 tons
3. Saving on license: $94 per year
4. Increased gasoline mileage: 0.526 miles per gal.
5. Saving on tires: 15%
6. Reduced maintenance.

These are the kinds of economy that you can get from well planned Aluminum equipment. You may also want to follow the lead of the most progressive operators, and seek a maximum use of Aluminum in engines, cabs, chassis, wheels; weight saved in those parts is economy too! Write to us, or ask any up-to-date builder, for complete information about bodies and trailers built economically light. ALUMINUM COMPANY OF AMERICA, 2152 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

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FOOD INDUSTRIES

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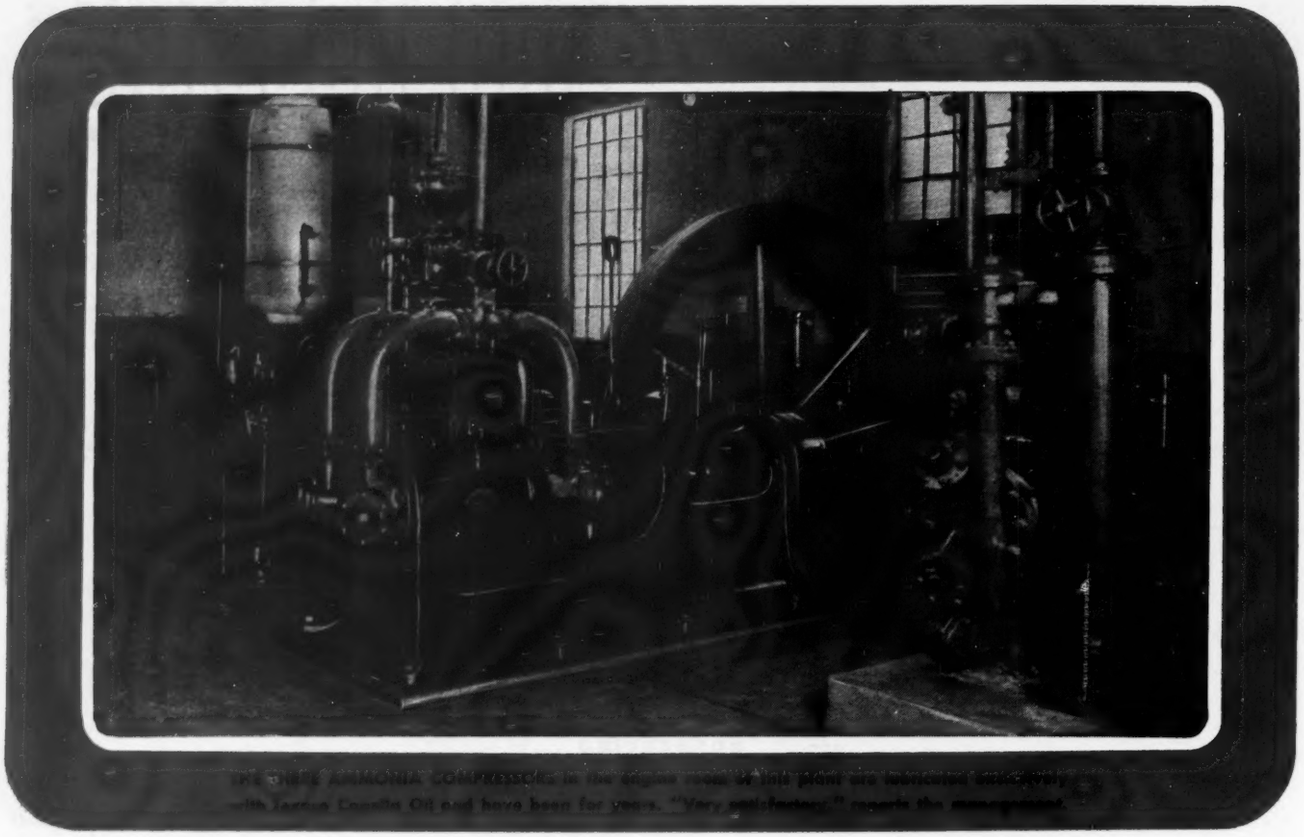
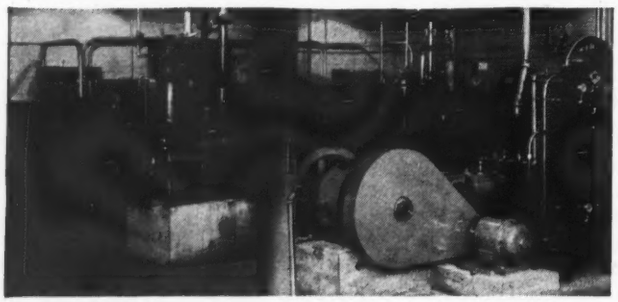


THE THREE AMMONIA COMPRESSORS in the engine room of this plant are lubricated successfully with Texaco Capella Oil and have been for years. "Very satisfactory," reports the management.

DISTILLED WATER ICE PLANT HIGHLY RECOMMENDS IT



VILTER VERTICAL AMMONIA COMPRESSORS maintain high efficiency when lubricated with Texaco Capella Oil. Vilter approves the use of Texaco Capella Oils in both vertical force-feed and horizontal Vilter Compressors.

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment —Every Wednesday Night—Columbia Network—9 E.D.T., 8 E.S.T., 8 C.D.T., 7 C.S.T., 6 M.S.T., 5 P.S.T.

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"WE WOULD NOT HESITATE to recommend to plant operators the use of Texaco throughout the plant."

This plant* has been lubricated with Texaco continuously and exclusively ever since 1925 . . . 14 years.

Rapid and complete separation from the condensed steam is vital to a distilled water ice plant. To get this complete separation, the engines here have been lubricated with Texaco Vanguard Cylinder Oil.

Texaco Capella Oil is used and recommended by this plant for compressor lubrication, because it is dehydrated, keeps oil lines free, expansion valves operating properly, and does not react with refrigerant.

For Texaco perfected lubrication in your plant, call the nearest of our 2229 warehouses. Texaco engineers will help you select the proper grade of Capella.

The Texas Company, 135 East 42nd Street, New York.

**Name on request*

TEXACO CAPELLA OILS

PERFECTED LUBRICATION FOR COMPRESSOR CYLINDERS

FOOD INDUSTRIES

DISTRIBUTION • PROCESSING

Established 1928 — McGraw-Hill Publishing Company, Inc.

LAURENCE V. BURTON, Editor

Volume 11, Number 5 May 1939

The Talk of the Industry

» THAT April 10 hearing on standards for canned peaches turned into a sugar hearing with the peaches occupying a very minor role. So vigorous was the battle of sugar (dextrose vs. sucrose) that a continuation was granted until May 1 to allow sucrose to bring up the artillery. The next clash is going to be a honey.

» HERE is a new angle on packaging. An Indianapolis woman is suing A. & P. for $2,999 damages sustained, she avers, because she slipped and fell on a plum which had fallen out of an

uncovered basket. Though A. & P. paid her medical and hospital expenses, she claims the permanent loss of use of her right arm.

Open display evidently carries certain hazards.

» AFTER a little dinner in Washington where the speaker was the youthful legal adviser to Wages and Hours Administration, we heard this comment from the floor. This man had just returned from a lengthy study of Germany.

"Except for your very obvious sense of humor, I would think I was back in Germany. There is no other difference between the administration of the Wages and Hours law and Fascism as practiced abroad."

» NOW THAT THE MEDICOS have discovered how gelatin increases the muscular endurance of men (not of women) we shall expect to see a wild scramble to incorporate gelatin in foods so as to get the benefit of the new advertising angle.

What bothers us is why many gelatin manufacturers seem to think that unflavored gelatin possesses all the virtue. What has flavor to do with it? Why not let the gelatin taste good?

Biggest problem to face is the matter of cost, for gelatin is not an inexpensive food.

» IF AN intelligent young man from our own editorial research department has called on you for a few minutes to ascertain your likes and dislikes, please accept our thanks for your gracious reception. All he is after are the facts—brickbats or bouquets.

» IF THE GOVERNMENT of the United States is ever to have a balanced budget, it is up to the people—all the people—to "ride" their duly elected representatives. A little lobbying back home goes a lot farther than sending some one to Washington to remonstrate. Learn effectively how to heckle your Congressman when he comes home to tell you how good he is. Make him justify his stand on all the appropriation bills.

If he is a spender, he'll change his policy very quickly if his constituents begin to ride his tail. With few exceptions he sought his job, campaigned for it. If he doesn't like it, if he doesn't like to receive instructions, tell him he can quit. He's not in the Army.

» WHAT is good advertising? Most scientifically trained men smile indulgently at the advertising of White Rock Mineral Water which admonishes one to get over on the alkaline side. Yet those who best understand advertising psychology claim that this is good advertising.

Shall the same be said of the advertising of a swank New York restaurant which blatantly says "Frozen Fish Get the Cold Shoulder Here"? The direct statement is probably truthful, but the implied idea that frozen foods are not as good as unfrozen foods is highly controversial.

Processing does not improve the quality of the raw material. Processing, at best, merely retains the original quality. The raw material may be good, fair or poor, even though it may be cooked or consumed in the most luxurious of surroundings.

Unfortunately, however, half truths

are still the basis for what is considered smart advertising.

Mr. Dunn Would Amend the Food and Drug Law

ONCE AGAIN it is evident that the federal regulation of foods should be under a law that does not cover any other product such as drugs, devices or cosmetics. Mr. Charles Wesley Dunn, counsel for certain drug groups as well as Associated Grocery Manufacturers of America, has induced Congressman Lea to introduce a bill to extend the effective date of drug labeling provisions of the new Food and Drug Law from June 25, 1939, to Jan. 1, 1940. This bill would also affect the date of certification of coal tar colors. Also food standards.

Practical compliance with drug labeling requirements is a problem considerably more complex than food labeling. Possibly drug manufacturers deserve an extension of time. We do not profess to know anything about it. But we do know that starting such an amendment through Congress is to invite trouble in the form of alterations to the originally proposed amendment and also the introduction of additional amendments.

Addressing the American Chemical Society symposium on the Food and Drug Law on April 4, Mr. Dunn promised that his clients would not press for any other amendment than the extension of the effective date. But neither Mr. Dunn nor Mr. Lea can guarantee that such an amendment can be enacted in the form in which it is introduced.

The Food and Drug Administration, well aware of this fact, opposes the time extension on the ground that it is the entering wedge for emasculation of the new law before it becomes effective. Mr. Dunn on the other hand, apparently believes he is able to manage both houses of Congress. If he were powerful enough to accomplish such a miraculous feat without the aid of Jim Farley's patronage club, there could be no serious objection to his amendment. But it would be too bad if it led to a condition in this country parallel to a maxim that exists in the French Army: "When you receive an order, do not obey, but wait for the counter-order."

As it is, Mr. Lea has introduced two bills to amend the law. The first embodies Mr. Dunn's ideas. The next postpones the effective date of inseparable labels (lithographed cans) until July 1, 1940. This begins to look like the deluge of amendments to be expected.

Listing the Ingredients

SPEAKING of the new food law, it is very gratifying to all concerned to learn that proper labeling is much easier than anyone in the industry had suspected. No longer is it necessary to put all the mandatory information about ingredients on the front panel. This was announced in April FOOD INDUSTRIES, page 239. But it must be prominent and conspicuous, wherever it is.

When designing labels for foods for which there is no official standard of identity, the problem of designating the ingredients is still one which requires considerable thought. Right now sugar is deserving of some interpretive rulings by the Food and Drug Administration.

Specifically, food manufacturers who used sugar as an ingredient want to know if the term includes only sucrose, or will it also cover the soft sugars as well as invert sugar and malt sugar? Also will it cover dextrose, levulose and glucose syrups. If not, what designations would be acceptable?

Nutritional Research Progress

SPEAKING of Mr. Charles Wesley Dunn, whose more recent activities are discussed elsewhere, you may recall that last December he proposed an institute. This is to be an institute for research in the field of nutrition. He proposes that it is to be financed by the large food manufacturers of the country, most of whom are members of A.G.M.A.

Now it happens that Mr. Dunn was a speaker at the spring meeting of the American Chemical Society in Baltimore. Because he is a very busy man it seems unlikely that he attended any of the scientific sessions, or that he even studied over the huge program. He announced that he was on

Hors d'Oeuvres

• Corn is supposed to have originated in Central America and to have been under cultivation as far north as New England when Leif Ericson dropped in on America. So Kentucky has been full of kernels much longer than the colonels have been full of corn.

• *Close to nine billion packaged items in glass and tin are delivered to American kitchens each year. Of these at least five billion irritate consumers when they attempt to remove the closures.*

• The Pilgrims used to freeze the succotash which the Indians taught them to make. Then they would chop off a hunk as needed. And we thought that frozen succotash was a relatively new product.

• *How long does it take to boil a three-minute egg at 8,100 ft. altitude? If you're never up in the air at the breakfast table, you won't care. But it is important that the chef on the "Yankee Clipper" know that the time is twelve minutes.*

• Gelatin is a muscle builder for men, scientific research has revealed. Any Sunday evening now we expect to hear Jack Dempsey extolling six delicious flavors.

• *We recently referred to the effect of the diet on the cheerfulness of man. Now we hear the thing that makes him grouchy is a rough surface on a necessary item of supply in the bathroom.*

• Butter adulterated with mineral oil recently was seized by the Food and Drug Administration. But such a product has possibilities as an intestinal lubricant. People could exlax when they eat.

• *Borden's* Milky Way *says that Uncle Sam's efficient postoffice charged 12 cents for delivering a quart of milk to a door where the milkman set it for 13 cents. And Uncle Sam didn't have to bear the cost of the milk, the processing or the container. Phooey on Farley.*

• When coffee was first introduced into Europe it was assailed as an infidel beverage. But Pope Clement VIII baptized it as a Christian drink because it was "so delicious that it would be a pity to let the infidels have exclusive use of it." Think what the devil could do if he still had coffee as a tool of temptation.

• *In Lima, Peru, an enraged bull fight fan heaved an ice cream cone at a dallying matador. Perhaps baseball umpires offer an unreached market for ice cream manufacturers.*

• A contest will be held at the California World's Fair to see if governors can milk cows. If they do as well by the cows as by the taxpayers they will be veritable milking machines.

• *Out of 4,000 salmon eggs hatched at the spawning grounds only two reach maturity, and these are caught and put into a can. Futile is the life of a fish.*

—F.K.L.

his way to Washington that very afternoon of April 4.

But if he had studied the voluminous program or tried to sit in three concurrent meetings bearing on various aspects of nutrition and extending for one to two and a half days, he could not have failed to have been impressed by the fact that already a tremendous amount of research on nutritional subjects is under way. The amount has grown so huge that it is very doubtful that the existence of another institute for research on nutrition would do much to accelerate the development of the science of nutrition.

Research turns out facts or fragments of knowledge which, in turn, must be fitted together or rejected. The parts which fit together will gradually build up the science or the "truth". Then this must be translated into practice, either industrial practice or public education, both of which are very slow. It seems unlikely that it would accelerate the latter phase of progress in human nutrition by further speeding up the process of developing more fragments.

Far Reaching Policy Change

LITTLE THINGS often spell the difference between success—and something less than success. The balance is often tilted this way or that by forces that are seemingly featherweight, as, for instance, in a small change of policy in a big food company that seems to have brought success to it.

A change of presidents a few years ago did not result in the expected wholesale slaughter in the upper brackets. Nothing very momentous happened. At least, it was not a matter that attracted much attention when the new president required that all subordinates produce a recommended course of action whenever they reported to their superiors. Yet that seemingly insignificant policy-change now appears to be the major factor in the changed fortunes of the corporation.

In earlier days, a superior received only raw statistics or undigested memoranda and reports from those under his jurisdiction. He spent unconscionable hours in studying them and then trying to decide what to do. Today he gets the figures and reports, but the one who has compiled the data or made the observations (and should know all about them if anybody does) is required to accompany them with his own idea of the proper move or decision to make.

In short, this new policy is putting more minds to work, and is making real business men out of previously undeveloped talent. And the decisions are coming now from men who are really in touch with the facts—rather than what somebody else says or alleges to be the facts.

The Challenge to the Food Technologist

WHEN IT COMES to complying with all the provisions of the new food law, the role of a laboratory analyst it is likely to be of diminishing importance compared to the role of a chemist or food technologist who really directs plant operations.

Management must face the fact that proper food composition alone is only a small part of compliance. It is becoming evident from the testimony at hearings on standards that what goes on in a factory is to be more closely scrutinized by food inspectors than the composition of the food itself.

For adequate compliance, the chemist and food technologist must be given wider responsibilities. These must be accepted and carried out with true managerial skill. The immediate future calls for greater technical and administrative capacity than in any previous period since about 1915. And management will be remiss if it fails to utilize the technical services that are available. Correspondence coming to this office indicates an imperative need in this direction. If managers have not the time or patience to figure things out regarding the new law, it is time to employ someone whose job it shall be.

Keep Eternally At Public Relations Work

BUSINESS CONTINUES to grow more and more conscious of its huge problem in the field of effective public relations. But the will to do something about it has not come to very many business men. Right now many of the biggest businesses are doing some effective work. This is not enough. All business must get aboard the band wagon, and stay there.

One company felt that its employees needed education on whom they were working for. On what sort of people were the stockholders. They then did a splendid job of portraying to employees that most of the stockholders were folks just like themselves, not a bunch of plutocrats who wore silk hats. What was the result?

The employees in effect said, "Oh yeah?" Now is that a bad reaction or a good one? Our opinion is, that if such a reaction occurred, the company was certainly correct in its diagnosis of the problem to be corrected. Also that much more of this sort of thing needs to be done. It will probably take years of work to correct this situation.

Management should never make the error of thinking a single telling of such a fact will sink far into public consciousness. Public relations work requires continuity—like advertising. Keep eternally at it!

Clarifying Labor's Responsibility

NO COURT DECISION, equal in importance to the famous old Danbury Hatters Decision in defining a labor union's financial and moral responsibility, has appeared in all the years until the recent Apex Hosiery Company decision in early April. In case you have forgotten it, the Danbury decision assessed members of a union for damages to a factory destroyed during a strike. Most of them lost their homes and it has been a bitter memory in organized labor's history.

The Apex case, still to be appealed, assessed triple damages under the Sherman Anti-Trust Law for wrecking of the plant by strikers staging a 48-day sit down. The award was $711,932.55 plus $25,000 for attorney's fees. Defendant was C.I.O.'s American Federation of Hosiery Workers, Branch No. 1.

If the judgment is sustained in the higher courts, the belief is that the union, but not the individual members of the union, is responsible. Which will make it difficult to collect the money.

Labor squawks loudly that the Sherman Law was not designed to cover such a case. Manufacturers hope, however, that the responsibility of organized labor will be considerably clarified by the Apex decision.

What About It?

"WHAT HAS BEEN DONE to improve lard to the point where it can meet the competition of vegetable shortenings?" asks an investment banker who has just discovered that he is in the lard business up to his ears. And evidently he is one of those nosey stockholders (or bondholders) who demands to know why? Why?? Why??? Always quite a nuisance to management, especially when

the answers are not very satisfactory.

Will any one arise to speak for lard? Or are we waiting, like Henry Ford in Model T days, for the public to come back to its senses? When you are writing out your thoughts, you might also answer this: Is lard a finished product, or is it more properly considered to be a raw material needing much further processing?

Or shall we write an editorial about it?

What to Do with a Food Technologist

PICK UP any copy of Notices of Judgment, published by the U. S. Department of Agriculture. Read the disposition of the cases resulting from legal action against foods under the *old* Food and Drug Law. (It will be tougher under the new law.) And then consider the probable causes of the violations of the law. Here are a few, taken at random:

Canned field corn substituted for canned sweet corn.

Substandard canned tomatoes improperly labeled.

Candy containing insect fragments, rodent hairs, etc.

Egg noodles containing artificial coloring.

Nutmeats, rancid and insect infested.

"Olive Oil," consisting mainly of cottonseed oil.

Imitation vanilla containing glycol.

Butter containing less than 80 per cent fat.

Cheese deficient in fat.

Maple syrup containing lead.

Canned "mustard" greens that were partly spinach.

Pepper containing pepper shells.

Butter cookies containing no butter.

Rancid corn chips.

Catsup too high in mold.

Flour (6,300 sacks), weevil infested.

What were the causes of these seizures? Quite a variety of answers could be given. Plainly, the last one was misfortune. Carelessness and insufficient inspection explain some of the others, though it does not excuse them. Ignorance of good manufacturing technic can explain others. Plain ignorance accounts for others. And also there are probably certain reprehensible motives in other cases.

Wouldn't it be a smart procedure to hire a trained food technologist to guard against such mishaps? Give him a good workout in the various departments so that he is familiar with all manufacturing details. Then, if his personality is suited to this type of work, let him everlastingly check up on all operations to be sure that quality is what it should be, that labels are correct for the product placed thereunder, that packages are adequate to protect the goods.

In big plants this would be a full time job. In small places your food technologist can take on a few additional duties.

New Type of Dog Food

HERETOFORE the business of manufacturing dog food has been almost entirely in the province of the meat packer or the baker. Now comes the dairy industry with "Ween" for puppies. It seems to consist of evaporated milk, carrotin, dextrose, and cod liver oil.

If this new type of dog food is all that some dog owners aver it to be, it seems likely that the dairy industry has a possible new field of activity. It may not be very lucrative, but the potential volume is stupendous. The largest volume of any single item of canned food today is dog food.

The Meaning of Sterilization

WHAT DOES the word "sterilization" mean? This is no academic question. It is a term that food technologists must ultimately consider and define. Another term needing definition is "to sterilize." Also "sterilizing agent." All are important from the viewpoint of their use on labels of chemical agents that are commonly used for "sterilizing" food plant equipment.

In order to build up a background of previous thinking, we quote here the words of C. A. Holmquist, American Public Health Association Yearbook (1933-1934).

"The word 'sterilization' as used here and as it has been used for years in dairy work means bactericidal treatment resulting in the devitalization of milk-borne pathogens and the further material reduction of all bacteria."

In other words, there is a difference between commercial sterilization and absolute sterility. As a practical matter this difference should be recognized and be granted official sanction.

Calcium in a New Role

DR. Z. I. KERTESZ of New York Agricultural Experiment Station reported to the American Chemical Society, on April 6, that the addition of minute amounts of calcium to canned tomatoes will increase their firmness to a noteworthy extent. Less than 0.02 per cent of added calcium seems to solidify the fruit sufficiently that the quality grade will be from one to two notches better than without it.

If further experimentation bears out the practicability of this treatment, it would seem likely that the use of a less pure salt for salting the cans would be in order. Producers of unrefined salt may possibly find a small market here. Or producers of salt tablets may also want to consider the possibility of less pure tablets.

A further possible application of Dr. Kertesz's work may be found in the manufacture of chili sauce. Here is a product where firmness of the tomato is considered an asset, Perhaps the suggested trace of calcium would permit the production of the highest type of chili sauce by machine instead of the more tedious method of cooking hand-peeled tomatoes.

Institute of Food Technology

IN A FEW MORE MONTHS you will hear quite a lot about the new Institute of Food Technology. A group of well-known food technologists are preparing to organize an association or society on a national basis. The organization meeting will probably be held on July 1, immediately after the Conference on Food Technology at Massachusetts Institute of Technology, Cambridge, Mass.

Conference on Food Technology

THE SECOND CONFERENCE on Food Technology will be held at Massachusetts Institute of Technology, June 28 to July 1, 1939. Quality control and heat transfer will be the principal themes of the discussions.

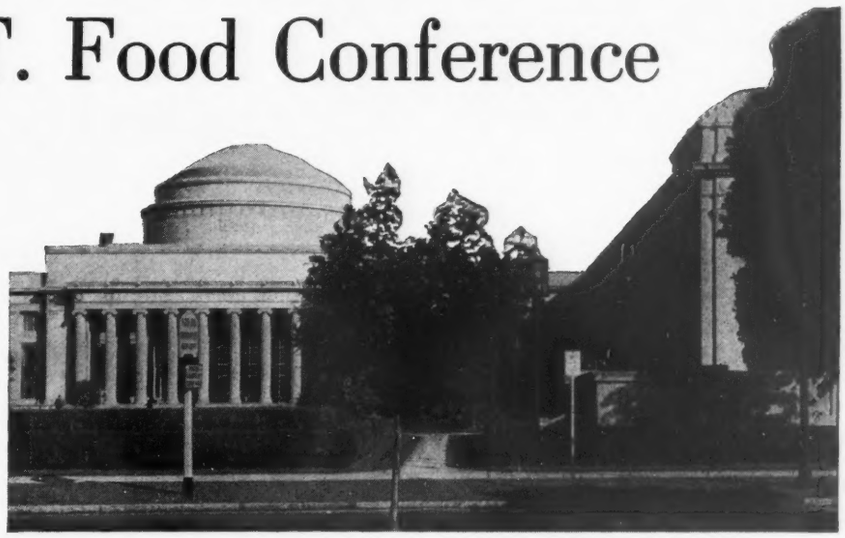
Every technical man in the entire food industry will want to be present. The program has been planned with commendable foresight so that men of widely varying interests will find the conference decidedly worth while. Details are given on page 247 of this issue.

New Way to Avoid Bugs?

INSECTS are incapable of seeing red, and hence are not attracted by red light, according to a friend who has been doing a bit of hobby-researching. If further investigation confirms this observation, the way to keep the bugs out looks easy. A factory with red windows and red lights, painted red inside might be a weird place, but free from insects.

In June, FOOD INDUSTRIES *will discuss the place of food manufacturing in the national defense. Don't miss it.*

Outstanding Technologists to Speak at M.I.T. Food Conference



Where important conference on food technology will be held, Massachusetts Institute of Technology.

OUTSTANDING authorities in the food industries and food research laboratories of the United States, Canada and possibly other countries will speak at a Food Technology Conference to be held at Massachusetts Institute of Technology, Cambridge, from June 28 to July 1. Expected to be as important as the first food technology conference held by M.I.T. in 1937, the meeting is under the auspices of the Division of Food Technology and Industrial Biology of the Institute, headed by Prof. S. C. Prescott, Dean of Science.

Like the first conference, this one will deal with the broad aspects of food technology, with special attention directed to quality control, food packaging technology, food engineering and refrigeration. Consideration of the specific relation of trained food technologists to the food industries will be a topic of particular importance.

One of the two sessions specially devoted to quality control will be the opening one on Wednesday morning. W. L. Campbell, general manager of Kroger Grocery & Baking Co., is among the authorities expected to participate. Others include Dr. F. C. Blanck, Food Research Division, U.S. Department of Agriculture; Dr. Harden F. Taylor, president, Atlantic Coast Fisheries Co.; Dr. Roy C. Newton, director of research, Swift & Co.; Dr. E. J. Cameron, National Canners' Association Research Laboratories; Dr. Mary E. Pennington, New York; August Haffenreffer, Haffenreffer Brewing Co.; and Dr. G. C. Robinson, Continental Baking Co.

The sessions relating to the engineering aspects of food technology will include papers on heat interchange by Prof. W. H. McAdams of M.I.T.; Dr. Paul D. V. Manning, Western Condensing Co., San Francisco; Paul Krueger, Chicago Health Department; and other technologists.

Attention will be focussed on recent developments in the baking and associated food industries at a session to be held jointly with American Institute of Bakery Engineers on June 29. Among the speakers will be L. J. Schumaker, President of American Institute of Baking, who will preside; Prof. H. C. Bailey, University of Minnesota; Dr. C. N. Frey, Fleischmann Laboratories; Dr. J. A. Tobey, director of nutrition, American Institute of Baking; and Dr. F. W. Miller, Jr., E. I. du Pont de Nemours & Co.

Recent developments in the packing of foods in tin, glass, transparent films and latex rubber will be covered in the symposium on food packaging technology. The speakers expected to contribute to this symposium include Roger H. Lueck, American Can Co. Research Laboratories; W. H. Harrison, Continental Can Co.; Dr. S. H. Ayers, Crown Can Co.; Dr. H. A. Barnby, Owens-Illinois Glass Co.; O. F. Benz, Cellophane Division, E. I. du Pont de Nemours & Co.; and M. T. Rogers, Dewey & Almy Chemical Co.

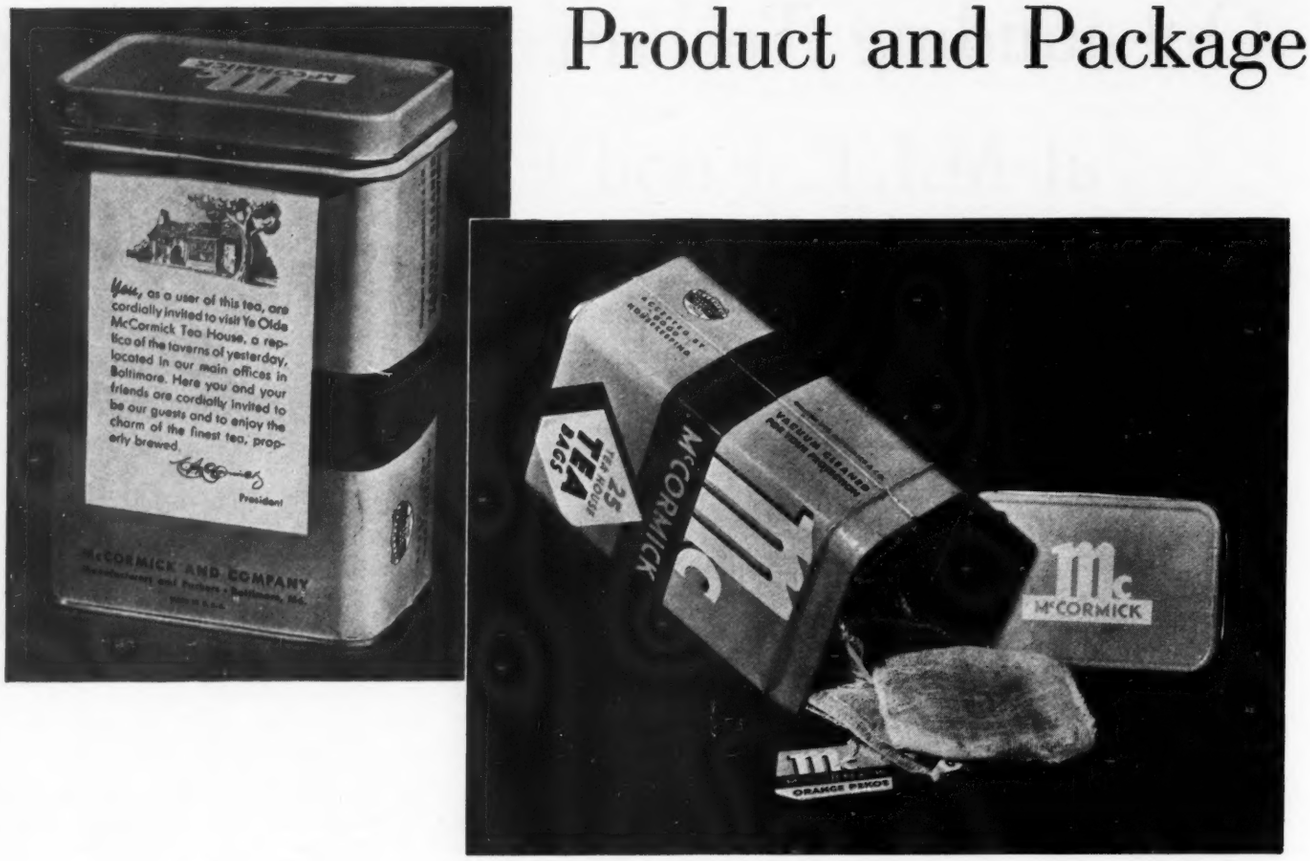
Speakers at a symposium on foods and refrigeration, held in cooperation with American Society of Refrigerating Engineers, probably will include Dr. D. Breese Jones, U.S. Department of Agriculture; Dr. W. H. Cook, Canadian National Research Council; George Hulse, chief engineer of Safety Car Heating and Lighting Co.; Dr. S. A. Beatty, Nova Scotia Fisheries Experiment Station and Prof. Fred J. Beard, Iowa State College.

Among guest speakers expected to make keynote addresses are Clarence Francis, president, General Foods Corp.; Dr. H. A. Baker, president, American Can Co.; President K. T. Compton of M.I.T.; J. L. Kraft, president, Kraft-Phenix Cheese Co.; Dr. O. E. Baker, U.S. Department of Agriculture; Dr. L. V. Burton, editor, FOOD INDUSTRIES and Prof. W. V. Cruess, University of California.

In addition to the sessions, a diversified program of entertainment is planned. This will include special luncheons, a barbecue at the Dewey and Almy plant, an evening at the Boston Symphony "pop concert" and a banquet at New Ocean House, which will conclude the program of Friday. There probably will be a Saturday morning program, following which time will be left free for the proposed organization of an association of food technologists.

Present indications are that attendance will be as large as in 1937, when over 600 were registered. Dormitory facilities will be available in the M.I.T. Senior House at $1 per night. There will be a registration fee of $2.50, and applications for registration cards should be made in advance to Prof. B. E. Proctor, Massachusetts Institute of Technology, Cambridge, Mass.

Product and Package


You, as a user of this tea, are cordially invited to visit Ye Olde McCormick Tea House, a replica of the taverns of yesterday, located in our main offices in Baltimore. Here you and your friends are cordially invited to be our guests and to enjoy the charm of the finest tea, properly brewed.
President
McCORMICK AND COMPANY
McCORMICK
TEA BAGS
25
TEA BAGS
Mc
McCORMICK
ORANGE PEKOE

McCormick and Company, Baltimore, employs this package as an ambassador of good will. On the back panel, the company bids for good public relations with an invitation to customers to visit "Ye Old McCormick Tea House" in the company's main office in Baltimore and "enjoy the charm of the finest tea, properly brewed."

By
IVAN C. MILLER
Distribution Editor, Food Industries

Part I

MANY companies with sufficient resources employ counsel to guide company policy toward the end of building and maintaining public good will. Companies with smaller resources attempt to create good public relations locally through employees and in the field through salesmen and advertising. But there is one public relations agent that serves all food manufacturers wherever food manufacturers have distribution. That agent is the manufacturer's product.

For many companies the product —often a trade-branded packaged product—makes the only contact between producer and consumer, creates the only impression the consumers form regarding the company.

Regardless of how extensive may be the other endeavors of a food company to obtain good public relations, the impression created by the product is the last impression created —the final word.

The good will created by a product may be strong enough to offset undesirable impressions created by company policies (or lack of them). On the other hand, the product and its package may destroy much good will created by other agencies of the food manufacturer—may undermine all the company's efforts to obtain good public relations.

The product and its package are important company representatives in obtaining good will and good public relations.

When a product first comes on the market or first enters a new market and fails to gain approval, good will is not established. The product in its container, the package and the label must appear favorably on the shelf with competitors' products before the product even goes on trial. That does not mean only that a can of beans must compare favorably with competiting cans of beans, but it must compare favorably with all other food products in the retail outlet.

If a manufacturer has built good public relations with his retailers, the product may be endorsed or underwritten by the retailer. On dealer's recommendation it may go on trial. Few manufacturers have such widespread satisfactory dealer relations. On the dealer's recommendation a product may be given a trial and gain for itself general acceptance. A good product is a good manufacturer's best representation in building good public relations.

Not only must a food manufacturer have products that are sound, to gain acceptance and build good public relations, but the products must remain prime throughout shelf-life in the dealer's store. Preservation of quality throughout shelf-life is a problem frequently solved by proper packaging. The selection of package to maintain quality of products should be based not on the average shelf-life of the product but on the shelf-life in outlets with the minimum turnover.

Often food manufacturers must face the question, whether to package to

Can Help or Hinder

Good Public Relations

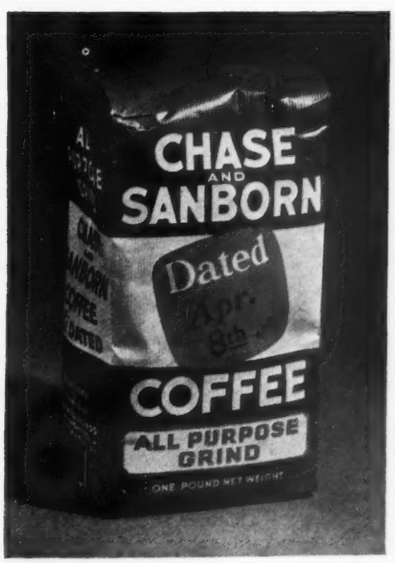
Packages and products that have recently appeared on the market, indicate that some food manufacturers are aware of the importance of both their product and their package in creating good will among consumers

PUBLIC RELATIONS IN THE *Food Industries*

maintain the product in a state of excellent preservation throughout the long shelf-life in the little store with very sluggish turn-over or whether to limit distribution to those outlets whose turn-over is rapid enough to come within the shelf-life of the product in its present package.

Not only must the package protect the quality of perishable products, oftentimes throughout a long shelf-life, but the package must also maintain its original appearance, if it is to remain a good company representative in building good public relations.

Manufacturers of prepared cake mixes face the problem of protecting a relatively delicately balanced food product throughout a longer shelf-life than many other food products must withstand. The package for these mixes must be grease proof and moisture-vapor proof. Duff's cake mixes are sealed in a waxed paper bag inside a waxed folding carton, tight-sealed, over-wrapped with sealed paper backed aluminum foil.



Dating a product creates an artificial shelf-life, whether the product's normal shelf-life is long or short. The distribution system must conform to the shelf-life created by dating.

Packaging which protects a perishable product securely throughout a long shelf-life is often expensive, unless viewed as the price necessary for good will and good public relations.

There are products of such highly perishable nature that packaging alone cannot protect them beyond a limited period, often less than average shelf-life. Maintenance of consumer acceptance and good public relations in the case of these products requires a distribution system which replenishes a small stock in accordance with turn-over.

There is a definite trend toward packaging food products previously sold in bulk, thereby creating greater good will and better public relations for these products. These and other improved packages are creating a good will which puts still other products on their mettle. Because of the recent improvements in both products and packages, and also because of the relabeling requirements necessitated by the new Food and Drug Law, this is a logical time for food manufacturers to review their food products and packages to insure that the products and packages are accomplishing the most in creating good will and building good public relations.

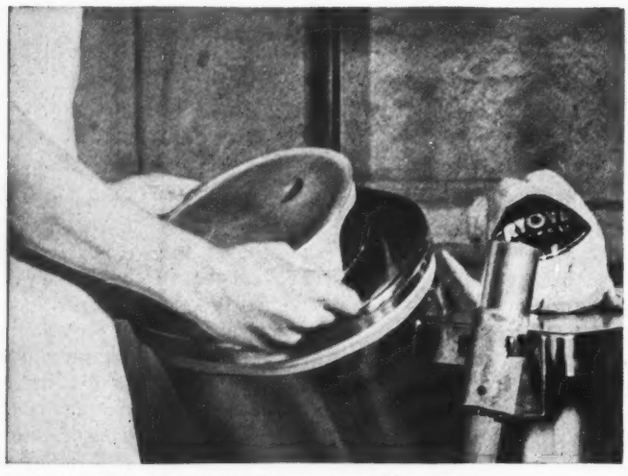
Part II, on the responsibility of the product and the package in obtaining and maintaining good public relations, will appear in an early issue.

Latex Rubber As a Frozen Food Container

STEP I—*The operator opens a latex rubber bag.*

Permits Faster Freezing
Avoids Evaporation

Re-use possibilities may adapt this process to carcass chilling

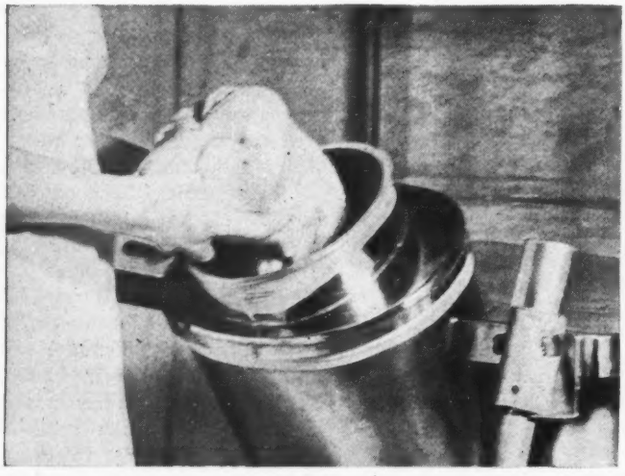


STEP II—*The bag is stretched over the can top.*

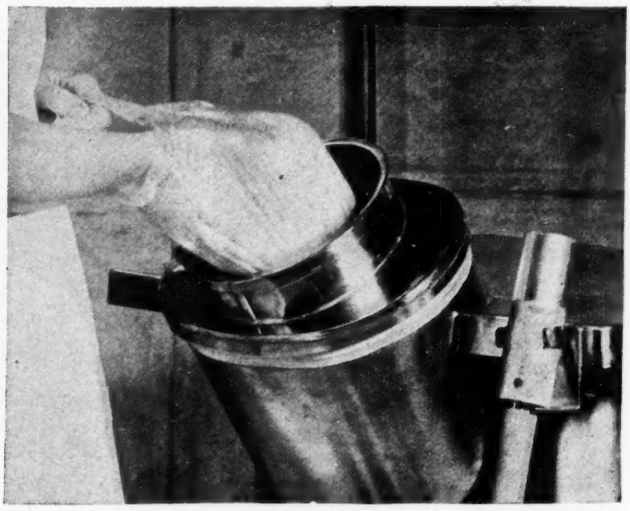
SIMPLICITY of handling, adaptability to a wide variety of irregular shapes of foodstuffs and superior protection of the frozen food are advantages claimed for the "Cryo-Vac" frozen food container. Another advantage claimed is faster freezing for large pieces of meat or other products by direct immersion in brine or by air blast. Based on the Hoveman patent (see FOOD INDUSTRIES, November, 1937, page 646), "Cryo-Vac" containers are bags of latex rubber which impart no taste or odor to the frozen food. They are made by Dewey & Almy Chemical Co., Cambridge, Mass.

The latex rubber of which the bags are made is moisture, vapor and gas proof. It is highly flexible and elastic And, in use, it is shrunk tight over the food, in which condition it becomes a transparent wrap.

Development of this container results from a unique quality of the latex rubber compound. When this material is warm, it is very elastic. But when chilled, the elasticity practically disappears. At the same time, the chilled latex rubber is much tougher than the warm, which protects the



STEP III—*After vacuum within the can has caused the bag to take the shape of the can, and a blast of cold air has caused the bag to retain its stretched shape, the operator thrusts a chicken into the bag, which is still in the can.*



STEP IV—*Bag, with the chicken within, is next removed from the can.*

container when in use from tearing or other than slight punctures which do not become enlarged.

Application of the "Cryo-Vac" container to a chicken before freezing is shown, step by step, in the accompanying photographs.

The latex rubber bags are available in convenient sizes and shapes, to suit the product that is to be wrapped. In operation, the bags are enlarged by one of two methods. That method shown in the pictures consists of stretching the bag over the open mouth of a can or box. Then a vacuum is drawn around the outside of the bag, from within the can, so that the bag takes the shape of the inside of the can. The other method is to enlarge the bag by introducing into it a measured volume of compressed air. In either case, the next step is to "freeze" the bag in this enlarged shape by chilling it.

As a result of these two steps, the container is fixed in an enlarged condition. The food to be frozen is then placed inside. Next, the air inside is withdrawn by means of a vacuum, so that the bag hugs the contents tightly. While the vacuum is on, the neck of the bag is twisted tightly, to hold the vacuum, and then heat-sealed.

This completed package is next plunged briefly into warm water, or exposed for a short time to a blast of warm air. This restores the elasticity to the latex rubber, so that the bag shrinks tightly around the food inside, contracting sufficiently to become a transparent wrap.

Following are the advantages claimed for the use of "Cryo-Vac" bags as containers for frozen foods:

1. The package is moisture proof, vapor proof, and hermetically sealed;
2. All the natural moisture is retained in the product frozen;
3. Evaporation during freezing and dehydration during storage are prevented;
4. Mold growth, oxidation and the development of rancidity are inhibited by evacuation of the air from within the package;
5. Freezing can be carried out by any of the following methods: immersion, brine spray, air blast or contact;
6. Freezing is quick and economical, because the latex rubber hugs the food material tightly and presents little resistance to heat transfer;
7. Freezer burn is avoided;
8. The hermetically sealed package aids in avoidance of contamination of the food right up to the time when the consumer purchases the product in the retail food outlet.
9. With such foods as whole poultry and corn on the cob, the light, transparent wrap makes an attractive package with high consumer eye appeal, shows the food attractively, prevents crystal formation between the food and the wrap, and also allows labels to be placed inside of the package;
10. Saves expense of defrosting coils in storage rooms, as the vapor-tight wrap permits the escape of no moisture from the food.

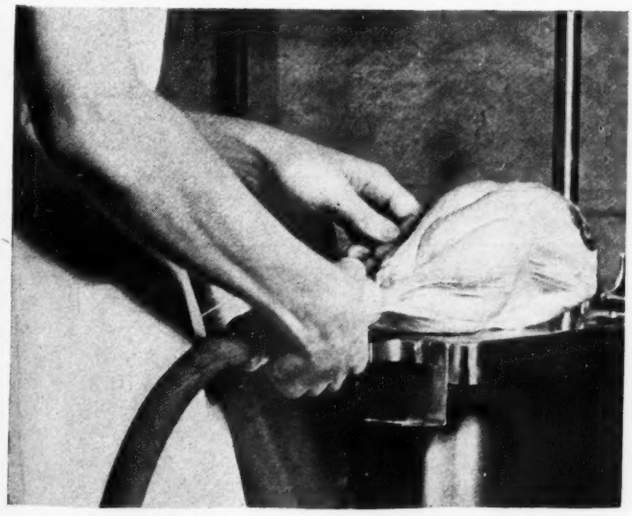
"Cryo-Vac" latex rubber bags, in various sizes, have been used for quick frozen packs of various kinds of poultry, of steaks, kidneys, livers, whole lambs, quarters of beef, and corn on the cob. Many other applications, such as for hams, sides of bacon and other cured and fresh pork products also exist.

Another suggested use for the bags is in frozen storage of fresh hams awaiting cure. The method would permit storage during periods of flush hog marketings, without loss by shrinkage, so that curing could be carried out according to some schedule based on other factors than the supply of hams. The method can also be used to avoid the development of rancidity in cured hams held for long periods before smoking. When used in this way, the bags can be re-used many times for the same purpose.

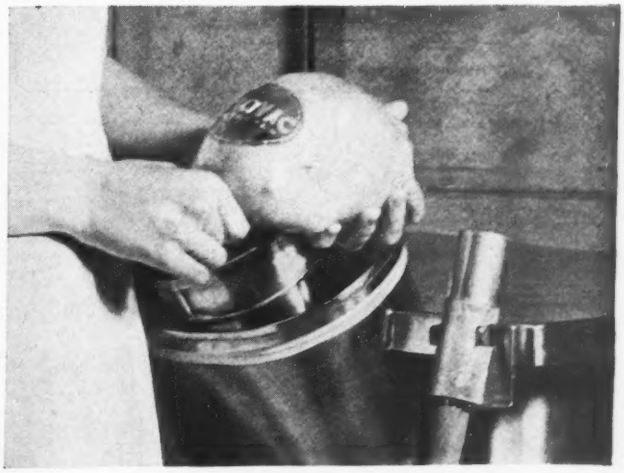
Other uses for this novel container will undoubtedly occur to those faced with problems of food freezing or storage.

▶***In any branch of food manufacture as new as quick freezing, much time must elapse and much experimentation be carried out before all of the technical problems are solved. In this article, a container, and its use in packaging foods before freezing, are described. From the information given, it is apparent that the new container holds promise for the solution of many knotty problems, both in the freezing and in the marketing of frozen foods. Its applications should be watched by***

All Food Technologists
Frozen Fruit and Vegetable Packers
Meat Packers
Poultry Packers



STEP V—*Vacuum from a hose exhausts the air from within the bag and causes it to hug tightly the contours of the chicken.*



STEP VI—*After the neck of the evacuated bag has been tightly twisted and heat-sealed to make an hermetic closure, a blast of warm air restores the elasticity to the latex rubber so that it shrinks and becomes transparent.*

How to Use Lactic Acid

In Finishing Pickles and Pickle Products

Part I

By

C. K. WADSWORTH

and

F. W. FABIAN

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ACETIC ACID has been used extensively as a food preservative for several reasons, chief of which are availability, germicidal value, and cost. In using acetic acid so extensively as a food preservative some important considerations have been overlooked. Possibly the outstanding one has been flavor. Nature, unlike man, does not confine herself to any one acid in preserving her products. For example, grapes contain principally tartaric acid; apples, malic acid; rhubarb, oxalic acid; while the citrus fruits, such as oranges, lemons, grapefruit and limes contain citric acid.

In products that are made by natural fermentation such as salt-rising bread, sauerkraut, genuine dill pickles, buttermilk and the like, we find again that no single acid is responsible for the flavor but it is rather a combination of acids, in addition to traces of many other compounds. In the case of these fermented products we find that not acetic but lactic acid is the principal acid produced.

In view of the foregoing considerations, experiments were performed to test the feasibility of using lactic acid, in whole or in part, as a preservative in pickles and pickle products.

Fabian and Wadsworth (1) studied the use of lactic acid in making sour pickles, sweet pickles, relish and processed dill pickles. They found that lactic acid was not suitable when used alone for making sour pickles because it did not possess sufficient germicidal value in the concentrations that were found necessary to use to procure a good flavor. If a sufficient amount was used to preserve the pickles, they were too sour. For this reason it was not considered practical for this type of pickle.

However, when lactic acid was added to sweet pickles, relish or processed dill pickles in the right proportion there was a decided improvement in flavor as attested by numerous organoleptic (taste) tests by experts in this field. Tests also showed that in the proportions recommended lactic acid could be substituted for acetic acid without any impairment in the keeping quality of the product.

Amount of Lactic Acid to Use

For sweet pickles it was found that the ratios of lactic acid to acetic acid which gave the best results was 1:4 or 0.4 per cent lactic* to 1.6 per cent acetic and 1:9 or 0.2 per cent lactic to 1.8 per cent acetic. The flavor was influenced by the amount of sugar (sucrose) present, but these two ratios appeared to be the best from the observations made. This does not necessarily preclude any combinations such as 1:5, 1:6, 1:7 or 1:8, but is rather the minimum and maximum ratios which it would be advisable to use from all considerations.

As has been pointed out by Fabian and Wadsworth (1) there are a great many factors entering into the flavoring of a pickle, such as the amount of spicing, sweetening and the amount of salt, as well as the amount of acid. All must be in perfect balance to procure the best product. The results of these experiments are given in Table 1. This shows the amount of sugar in terms of Baumé, the amount of acetic and lactic acids, the physical condition of the pickle, its color and flavor.

The spicing and salting were kept the same for all the different batches of pickles made so as to keep those factors constant. The only variables were the percentages of sugar and acids. The physical condition of some of the pickles was not as desirable as it might have been but it is felt that this condition can be easily remedied in the commercial processing.

Table II shows the results of using combinations of lactic and acetic acids in making processed dill pickles. Though the formula used in making these pickles was one used by a large pickle manufacturer, it was considered slightly too salty to suit our taste. Combinations of lactic acid with white distilled vinegar, in the proportions of 1.0 to 0.2 per cent, 0.8 to 0.4 per cent and 0.6 to 0.6 per cent respectively, gave good results; while 0.8 per cent lactic in combination with 0.4 per cent cider vinegar was considered the best. There is no question but that lactic acid can be used to good advantage in the manufacture of processed dill pickles, thereby greatly improving the flavor and more nearly simulating genuine dill pickles.

In Table III are given the results

*Per cent lactic acid expressed as acetic acid. To convert to per cent lactic expressed as acetic into lactic acid, multiply by 1.5. Thus 0.4 per cent lactic acid expressed as acetic equals 0.4×1.5 or 0.6 per cent lactic acid. Unless otherwise noted the per cent lactic acid is always calculated in terms of acetic throughout this article. This was done so as to have a basis of comparison of the two acids.

Table 1. Observations on sweet pickles made with a combination of acetic acid (vinegar) and lactic acid

Baumé	Per Cent Acetic Acid	Per Cent Lactic, as Acetic Acid	Condition of Pickle	Color of Pickle	Flavor		
					Acidity	Sweetness	General Conclusion
16	1.4	0.4	Firm but slightly rubbery	Good	Mild	Very sweet	Fair
18	1.4	0.4	Firm but slightly rubbery	Good	Sweet sour.	Very sweet	Fair
22	1.4	0.4	Rubbery	Variable	Mild	Very sweet	Fair
24	1.4	0.4	Rubbery	Faded	Mild	Mildly sweet.	Good
20	1.4	0.6	Rubbery	Good	Mild	Very sweet	Poor
14	1.6	0.2	Firm yet rubbery; not crisp	Good	Sour	Sour	Poor
16	1.6	0.2	Firm yet rubbery; not crisp	Good	Sour	Sour	Poor
18	1.6	0.2	Fairly firm	Good	Mild	Very sweet	Fair
20	1.6	0.2	Firm yet rubbery	Fair	Mild	Very sweet	Fair
24	1.6	0.2	Rubbery	Little faded	Mild	Sweet	Poor
14	1.6	0.4	Firm but slightly rubbery	Good	Sweet sour.	Sweet sour	Good
16	1.6	0.4	Fairly firm but slightly rubbery.	Good	Sweet sour.	Sweet sour	Good
18	1.6	0.4	Not very firm	Good	Sour	Mildly sweet.	Good
22	1.6	0.4	Slightly rubbery; not crisp	Good	Mild	Sweet	Poor
24	1.6	0.4	Crisp; firm	Good	Mild	Mildly sweet.	Excellent
14	1.8	0.2	Very firm; very crisp	Good	Very sour.	Sweet sour	Fair
16	1.8	0.2	Rubbery; not crisp	Good	Very sour.	Sweet sour	Fair
20	1.8	0.2	Not crisp; firm	Fair	Mild	Mildly sweet.	Good
22	1.8	0.2	Firm; very crisp	Good	Mild	Very sweet	Good

Table II. Observations on processed dill pickles made with a combination of acetic (vinegar) and lactic acids

Per Cent Lactic Acid (as Acetic)	Per Cent Acetic Acid	Source of Acetic Acid — White Vinegar			Source of Acetic Acid — Cider Vinegar		
		Acidity	Saltiness	General Opinion	Acidity	Saltiness	General Opinion
1.0	0	Sour.....	Noticeable.	Fair.....	Sour....	Noticeable.	Fair
0.8	0.2	Very sour..	Noticeable.	Fair.....	Sour....	Noticeable.	Fair
0.6	0.4	Sour	Noticeable.	Bad.....	Sour....	Noticeable.	Fair
0.4	0.6	Sour.....	Noticeable.	Bad.....	Sour....	Noticeable.	Good
0.2	0.8	Sour.....	Noticeable.	Poor.....	Sour....	Noticeable.	Good
1.2	0	Sour.....	Noticeable.	Bad.....	Sour....	Noticeable.	Fair
1.0	0.2	Sour.....	Noticeable.	Excellent..	Sour....	Noticeable.	Fair
0.8	0.4	Sour.....	Noticeable.	Excellent..	Sour....	Noticeable.	Excellent*
0.6	0.6	Sour.....	Noticeable.	Excellent..	Sour....	Noticeable.	Good
0.4	0.8	Sour.....	Noticeable.	Fair.....	Sour....	Noticeable.	Poor
0.2	1.0	Sour.....	Noticeable.	Poor.....	Sour....	Noticeable.	Poor
0.8	0	Sour.....	Noticeable.	Poor.....	Sour....	Noticeable.	Poor
0.6	0.2	Sour.....	Noticeable.	Poor.....	Sour....	Noticeable.	Poor
0.4	0.4	Sour.....	Noticeable.	Fair.....	Sour....	Noticeable.	Poor
0.2	0.6	Sour.....	Noticeable.	Fair.....	Sour....	Noticeable.	Poor

* Best of all

Table III. Results of the judgment of a group of pickle manufacturers on the flavor of sweet and processed dill pickles *

Sample	Baume	Acetic Acid Per Cent	Lactic Acid (as Acetic Acid) Per Cent	Number of Tasters	Per Cent Preference
Sweet Pickles					
A	24	1.8	0.2	26	70
B	24	2.0	0.0	26	30
C	20	2.0	0.0	23	65
D	20	1.8	0.2	23	35
E	24	1.6	0.4	20	15
F	24	1.8	0.2	20	85
G	22	1.8	0.2	21	76
H	22	2.0	0.0	21	24
Processed Dill Pickles					
1		1.0	0.2	18	67
2		0.6	0.6	18	33
3		0.4	0.8	11	46
4		0.8	0.4	11	54

* The comparisons were made between two sets of pickes such as A and C, C and D, etc., made at the same time under identical conditions.

secured by having a group of pickle manufacturers taste the different combinations to judge the flavor of pickles made with and without the addition of lactic acid. The data show that a majority preferred the pickles containing the lactic acid. In the case of the processed dill pickles, check samples containing only acetic acid were inadvertently left out. However, the data in Table III as compiled by Wadsworth (4) show the superiority in flavor of the pickles containing lactic acid. This is only natural since it has been shown by Fabian and Wickerham (2) that in genuine dill pickles made by natural fermentation the ratio of volatile acid as acetic to non-volatile acid as lactic is 1:8. This is a much higher ratio of lactic to acetic acid than was used in the experiment tabulated in Tables II and III.

In our work with lactic acid it was found that the simplest way to use lactic acid in making sweet pickles, relish, processed dill pickles and for rebrining genuine dill pickles was to mix it at the beginning with the vinegar (either distilled or cider), and water in the desired proportions. This combination may be used exactly as though it were vinegar alone.

As previously indicated, the maximum and minimum amounts which gave the finest flavor was a ratio of lactic (expressed as acetic) to acetic acid of 1:4 and 1:9 respectively. By use of the general formulas given herewith any combination of the acids may be made.

General Formulas

In developing the formulas, capital and small letters have been used. The meaning of the terms for which the letters are submitted is as follows:

A = Amount of vinegar to add, either by volume or weight.
a = Amount of lactic acid to add, either by volume or weight.
w = Amount of water to add, either by volume or weight.
W = Volume or weight of total amount of mixture desired.
P = Percentage of acetic acid (vinegar) in the final concentration of the mixture.
p = Percentage of lactic acid in the final concentration of the mixture.
D = Desired strength of acid (calculated as acetic) in the final concentration of the mixture.
S = Strength of acid in vinegar, by volume or weight.
s = Strength of lactic acid (calculated as acetic acid by volume or weight).

1. $A = \frac{P \times D \times W}{100 \times S}$ = amount of vinegar to add to the mixture.
2. $a = \frac{p \times D \times W}{100 \times s}$ = amount of lactic acid to add to the mixture.
3. $w = W - (A+a)$ = amount of water to add to the mixture.

N.B.: If per cent by volume is desired, use gallons in W and per cent acid by volume in S, s, and D (see Examples 1, 2 and 3).
If per cent by weight is desired, use pounds in W, and per cent acid by weight in S, s, and D (see Examples 4 and 5).
Do not use gallons in formula (1) nor pounds in formula (2) and (3). The formulas have been derived to be used as a unit throughout on a volumetric or gravimetric basis, as the case may be, and the two systems should not be mixed in making the calculations. They are simple and easy to apply and will save much time and confusion in addition to giving accurate results.

How to Use the Formulas

Commercial lactic acid is sold on a weight basis. For example a 50 per cent lactic acid solution is 50 per cent by weight. If it were calculated on the same basis in terms of acetic acid, it would be 33.3 per cent. This strength lactic acid has a specific gravity of approximately 1.12 at 60 deg. F. If it were tested by volume, the per cent lactic acid would be 56 which, if determined in terms of acetic acid, would give 37.3 per cent.

Commercial vinegar on the other hand is sold on a per cent by volume basis. In practice, commercial vinegar is usually measured by volume in terms of gallons, but lactic acid is and should be weighed, unless measured very accurately, because of its high acid content.

It is easier and more practical to use the volumetric method when you are substituting in the formulas to determine the amounts of acid necessary to use. However, in the case of lactic acid, the gallons should be converted into pounds, after the number of gallons has been found by means of the formula, because lactic acid is too concentrated to measure accurately with plant equipment.

Example 1

It is desired to make 125 gal. of a mixture of acid containing 11 per cent acid by volume. The ratio of acetic to lactic acid is to be 9:1. The materials to be used are distilled vinegar testing 11 per cent and lactic acid testing 50 per cent.

A = Amount of distilled vinegar to be determined.
a = Amount of lactic acid to be determined.
w = Amount of water to be determined.
D = 11 per cent acid desired strength of mixture (calculated as acetic acid by volume).
S = 11 per cent or 110 grains, strength of distilled vinegar.
s = 37.3 per cent, strength of lactic acid calculated as acetic acid by volume from 50 per cent lactic acid by weight.
W = 125 gal. volume of mixture desired.

$$\text{Ratio desired} = \frac{9 \text{ parts acetic acid}}{1 \text{ part lactic acid}} \text{ or } \frac{90 \text{ per cent acetic}}{10 \text{ per cent lactic}}$$

P = 90 per cent of mixture is to be acetic acid.

Substituting these figures in the formulas to determine the number of gallons of distilled vinegar, lactic acid

(*Turn to page 290*)

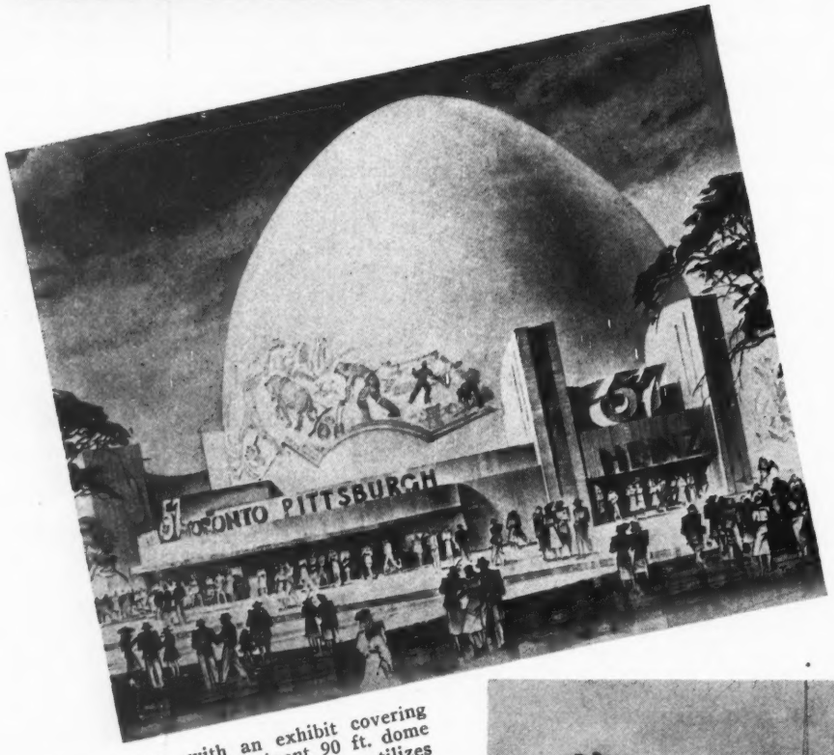
Food at the World's Fair

Plays a leading rôle in big show

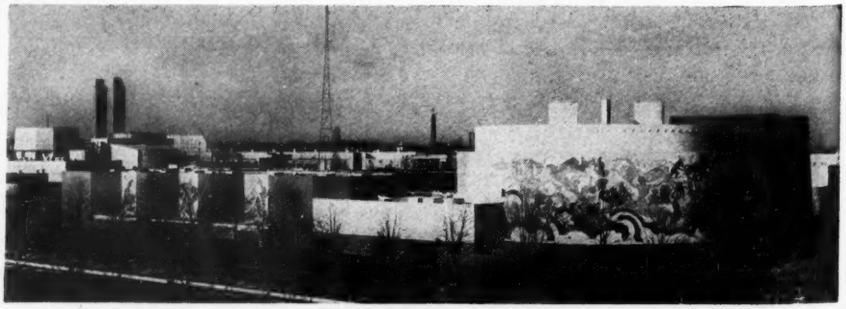
Three main food buildings and six company structures house multitude of interesting and educational exhibits. Processing demonstrated in dairy, baking, meat and beverage plants. Brewers operate restaurants and bars.

"GREATEST show on earth" is what New York World's Fair 1939 calls the "world of tomorrow" extravaganza built on 1,216½ acres of beautified Flushing dumps. And that is probably correct. The combined total investment in the Fair amounts to more than $156,000,000. Represented by exhibits are 60 foreign nations, 33 states and 1,400 exhibitors. More than 60,000,000 visitors are expected.

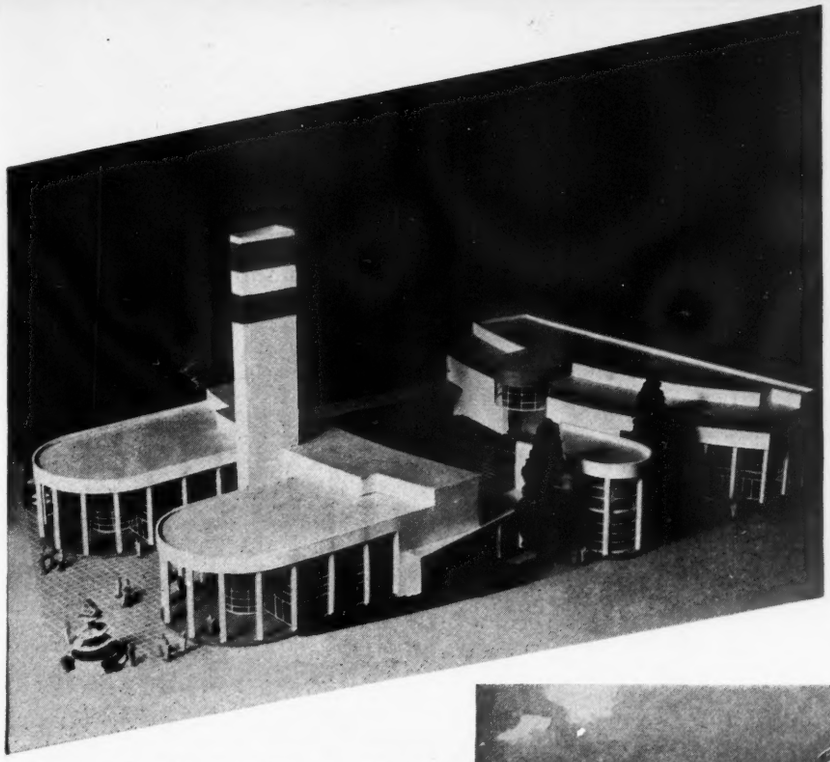
Food will play a major part in the big show. The Fair has made it the subject of a focal exhibit, the other focals being transportation, communication, production and distribution and community interests, science, education, and medicine and public health. It has built three food buildings to house the focal food exhibit and the displays of individual companies. Then there are six separate buildings constructed by food companies as their own spectaculars, not counting the



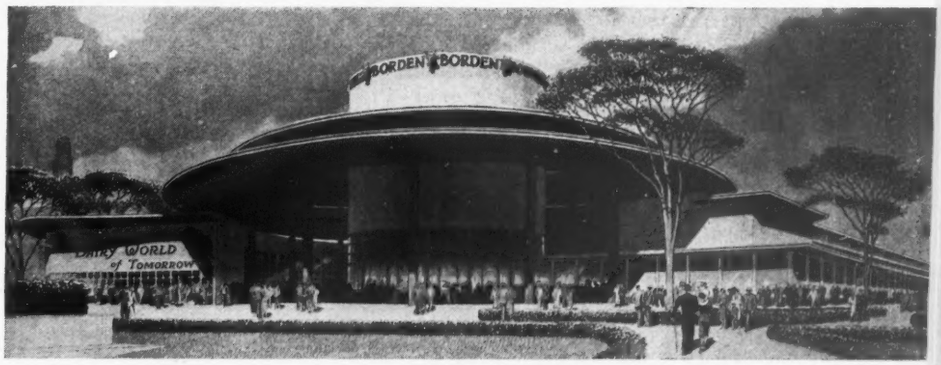
H. J. HEINZ Co., with an exhibit covering 20,000 sq. ft. under a prominent 90 ft. dome at one end of Food Bldg. No. 1, utilizes chemical agriculture to attract attention. Tomatoes are growing on vines 10 ft. high, these deriving nourishment from a chemical solution. Another attraction is the "Aristocrat Tomato Man," a robot. A sculptured group symbolizes "perfection" and the securing of food from all over the world. Six plaques demonstrate the company's progress in the preparation of food.



Exhibits of several food companies are housed in Food Bldg. No. 2.



STANDARD BRANDS has four pavilions surrounding an open air theater seating 1,600. The pavilions house displays. The theater is the scene of radio programs. The exhibits educate the people in respect to vitamins. Visitors may take a night blindness test as a stunt in vitamin A education. A cutting and wrapping machine shows how yeast is packaged. "A Corner of the Million Dollar Fleischmann Laboratory" demonstrates how yeast and coffee are tested daily. "Seventy-six round trips to the moon" is a dramatic display illustrating the yearly mileage of the company's distribution trucks. Bicycles operating generators enable visitors to test their energy, and a display shows the energy in a slice of bread. Gelatin is promoted by displays, and distilling apparatus shows the production of citrus flavors. The longest coffee bar in the world, 137 ft., will serve Standard Brands products.



BORDEN CO. tells the story of milk from Bossie to bottle in its $500,000 "Dairy World of Tomorrow." Visitors not only see cows milked on the merry-go-round rotolactor but see the milk pasteurized, irradiated and bottled, the bottles washed, and ice cream manufactured. Each cow is milked three times daily, and there are 150 cows milked in groups of ten, giving 45 milkings a day. Added attractions are 20 calves, replaced every three weeks to insure their being of a cute age, and a bull exercising pen. A milk bar and restaurant give visitors opportunity to sample the milk they have seen processed.

Heinz dome or the restaurants and bars. And all the food buildings are in a zone which is centrally located with respect to the Fair as a whole.

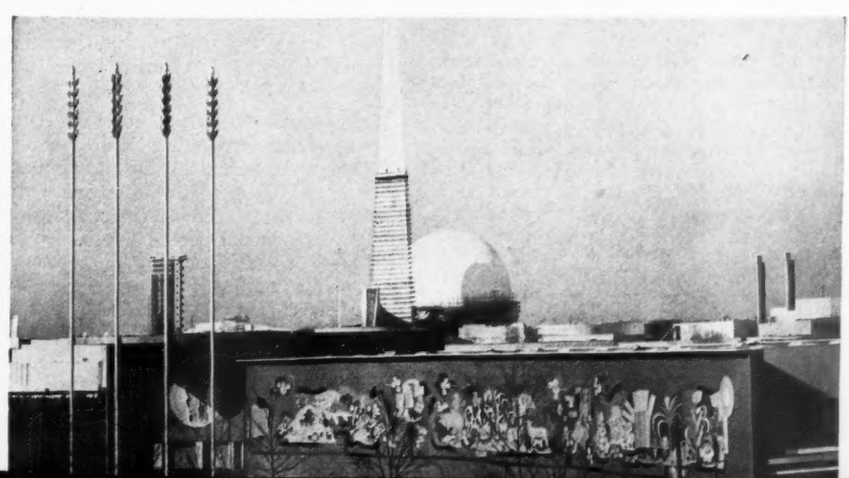
The combined efforts of the food focal and the exhibits of individual food companies should convince visitors that the food industries are performing a gigantic public service, that food processing is a highly technological and efficient business and that people should pay some attention to nutritional value in food products.

And because we like to stick our necks out, we predict that one of the hits throughout the Fair will be the rotolactor, or merry-go-round, on which cows are milked in the Borden exhibit.

As for people in the food manufacturing business, the Fair affords tours through ultra-modern baking, beverage, dairy and meat plants and shows besides laboratory control and miscellaneous processing. Then there is available information on nutrition and public health and a chance to study the reaction of consumers to various promotional appeals.

Visitors are impressed by the surrealistic extravaganza constructed by the Fair as the focal food exhibit. It dramatizes the important part that food plays in life. And people not too spellbound by the machinations of the colorful, animated three dimensional displays, acquire some education in the various phases and problems of production, processing and distribution of foods. However, manufacturers visiting the Fair feel that perhaps too little emphasis is placed on processing in the focal food exhibit.

"Man Equals Chemicals Equals Food" is the title of the first spectacular in the focal exhibit. It shows on the figure of a man the 35 elements which compose the human body and the foods that contain these chemicals. Having stared at this display for a while, the visitor wanders to "The Food Job." This shows in dramatic graphic manner the amount of food required annually by one person and also by the 130,000,000 Americans. Mounds of different foods are shown heaped on Manhattan Island alongside scale models of such landmarks as the Empire State building. The third section of the focal shows how division of labor and specialization of each part of the country in what it can best produce has increased the supply of food. Supplementing the "Food Job" is "Science and Invention Im-



In Food Bldg. No. 3 are the focal food exhibits and exhibits of individual food companies.

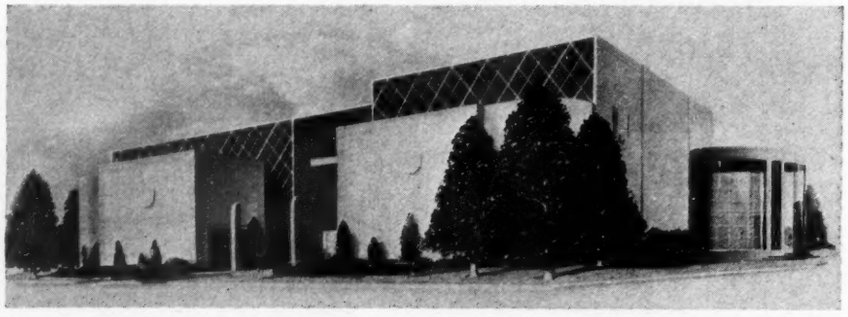
prove the Tools for the Job." This covers production, processing and transportation. The first part of the production section indicates by humorous exaggeration the efficiency of modern machinery as contrasted with primitive hand processing methods. Then a diorama demonstrates how improved plant varieties increase production and improved animals give more meat per pound of feed. Another diorama shows how science fights nature's thieves. A gigantic worm attempts to crawl up a wall to reach the foods, but each time it hits a ledge set up by science and falls back. Another enemy is represented by a fantastic bug. This comes flying over the wall to be knocked out of the scene by a boxing glove representing "science." Another display shows how science aids and restores food land. An interesting feature of the production exhibit is the one captioned, "Will the Chemist's Flask Do the Work of a Thousand Farms?" The central item in this display is a large three dimensional chemist's flask inside of which is a rolling agricultural landscape. At either side are two moving bands illustrating advances in the science of agriculture and researches into synthetic vitamins.

Three stories will be told in the section on processing. The first, "Preservation Holds Food Supply from Harvest to Harvest from Wasteful Decay," consists of revolving fruit trees laden on one side and barren on the other, set against a background of food preserved by different methods. "Death Cannot Poison Food Inspected, Sterlized and Packaged" is the dramatic title of the second spectacular on processing. This portrays by action a large black germ rising behind a pile of food and an "angel" popping out from behind a cloud and socking the germ over the head with a big club. The angel, which for some reason is black-faced, represents federal inspection. The third processing exhibit tells how "Factory Preparation Frees Mrs. 1939." This depicts a modern young woman surrounded by representations of prepared foods. In the background are various objects such as playing cards, typifying diversions for which Mrs. 1939 has time.

The transportation spectacular shows by animated figures how foods produced in one locality are speedily made available in remote areas—how bananas have been given to the Eskimos, for instance.

Under "Challenge of the Future" a series of flashers will "jump" out of the dark to dramatize what will happen to a person if not properly fed. One of these shows a child with the rickets.

CONTINENTAL BAKING CO. is doing an educational job in its exhibit. Every step in bread baking from sifting the flour to slicing and wrapping the finished loaf is demonstrated in a modern plant. Baking of Hostess cup cakes likewise is demonstrated by actual plant operation. The only field of wheat that has thrived in New York in 68 years is growing on 11,000 sq.ft. of land at the exhibit. Red, blue and yellow balloons, together with animated characters from Alice in Wonderland, emphasize the Wonder trademark. Opportunity to taste the products made in the display factory is offered by a sandwich bar.



BEECH-NUT PACKING CO's building covers half of the company's one-acre tract. Here the Beech-Nut circus is staged on a scale never before attempted. More than 500 "performers" participate. The exhibit also includes a display of products and a large counter at which Beech-Nut coffee is served free. Dieticians answer questions about strained foods, and food demonstrators are present. Dioramas illustrate growing, processing, packing and shipping of coffee, growth of chicle, tapping of sapota trees and processing of the sap, growth of peanuts and tomatoes and smoking of bacon. Emphasis in this exhibit is on the products and their nutritional value.

Highlights of several of the individual company exhibits are given in the captions of the accompany illustrations. Information on other exhibits follows:

COCA-COLA CO. not only sells its product throughout the Fair grounds but demonstrates in a large exhibit in Food Bldg. No. 3 "the bottling plant of tomorrow." A large mural depicts the plan of Coca-Cola in everyday life, while an animated cartoon in technicolor illustrates the world wide distribution and popularity of the beverage.

WAGNER BAKING CORP. bakes pies in an exhibit which occupies 1,160 sq.ft. in Food Bldg. No. 2. And after seeing how the pies are prepared, the visitors may sample their goodness at a refreshment stand in connection with the exhibit. Orders for a gift package are taken.

CANADA DRY GINGER ALE, INC., illustrates its advertising history and methods of manufacture through murals in Food Bldg. No. 2. In its exhibit is a Metamorphisor which shows bottles of carbonated beverages turning into appetizing drinks. Another display is a giant illuminated Canada Dry bottle. Canada Dry beverages are sold at a modern bar. Behind the bar is a world map showing cities where the products are available.

LIBBY, MCNEILL AND LIBBY'S exhibit is a "treasure ship" in Food Bldg. No. 1, the ship resembling an excursion steamer with large Libby cans for funnels. A series of animated dioramas gives the history of food preservation and canning. and a giant-size marionette show dramatizes the various divisions of the company's business and the use of its products in the home. Displays give ten reasons why Libby's 100 products are of superior quality. Visitors receive a souvenir coin bank if they sample Libby's fruit and vegetable juices.

"THE JUNKET FOLKS," Chr. Hansen's Laboratory, Inc., gets attention in its $20,000 exhibit in Food Bldg. No. 2 by free servings of rennet-custards, ice cream, candy and a new dessert made with Junket products. Ease of preparation, ready digestibility and nutritional value of the products made from Junket are emphasized.

PLANTERS NUT & CHOCOLATE CO. is emphasizing processing and the nutritional and chemical value of the peanut in its $30,000 exhibit. Occupying a space of 20x32 ft. in Food Building No. 3, the streamlined booth shows various stages of cultivation of the peanut by translites and a motion picture. Also portrayed is processing of the peanut to the time it is packaged. There are dis-

plays of the nut and its byproducts, murals depicting use and charts showing food and chemical values.

TAYLOR PROVISION CO. has set up an $11,000 exhibit in a 373 sq.ft. area of Food Bldg. No. 2 to tell the public that the old time Taylor Ham means Taylor Pork Roll, and that this pork roll is not a prepared cold cut like bologna but is intended to be cut thick and fried or broiled. Attention is attracted by the aroma of cooking pork roll, sold in large sandwiches for a modest sum to get the people to taste it.

S. A. SCHONBRUNN & CO. illustrates the production and use of coffee. Photos, murals, models and picture slides put the story across. The exhibit is in Food Bldg. No. 2.

B. FISCHER & CO., INC., illustrates by pictures and dioramas the production, gathering and shipping of coffee, tea and spices. Hostesses at the booth, in Food Bldg. No. 2, give out such information as may be desired by visitors.

LOOSE-WILES BISCUIT CO. entertains and educates visitors at its exhibit in Food Bldg. No. 2 with midgets garbed in baker's costume to represent the little Sunshine Bakers portrayed in advertisements. The performers sing, dance, box and do magicians' tricks, and between performances they pack giant cartons of the company's products. The exhibit also includes miniatures of some of the world's largest ovens and a diorama illustrating complete coverage of the country by Sunshine trains and trucks.

CURTISS CANDY CO. extols the nutritional and taste qualities of its candies in a booth in Food Bldg. No. 3. The display is animated with trains bearing ingredients into a miniature Curtiss factory and box cars carrying finished candy bars away. Three replicas of the Curtiss statuettes featured in advertising pop up at intervals and make statements about Curtiss candies. The scientific care exercised in making the confections is emphasized by a photomural.

CALIFORNIA OLIVE ASSOCIATION is making people in the East better acquainted with California ripe olives through a $20,000 exhibit in Food Bldg. No. 2. This is dominated by a mechanical Franciscian Friar which tells the story of the introduction of olives into California by the Spanish Padres. Supplementing this are translites of operations from the grove through the cannery. A recipe booklet is given out, a chart shows food values, and a revolving display exhibits products.

STAR POPCORN PRODUCTS, INC., has the popcorn concession of the Fair, and operates 30 stores. Each store is a small factory, where the corn is popped and packaged in view of visitors.

DOUGHNUT CORP. OF AMERICA has two major exhibits. One, Donut Palace, is on the Midway. The other, Donut Casino, occupies a wing of the Science and Health Building. Each seats approximately 700. By way of education in processing, display doughnut machines are operated.

P. BALLANTINE & SONS has a Three-Ring Inn in which it serves food. A capacity of 2,000 is portioned among three dining rooms and two outdoor gardens. There is entertainment in the dining rooms.

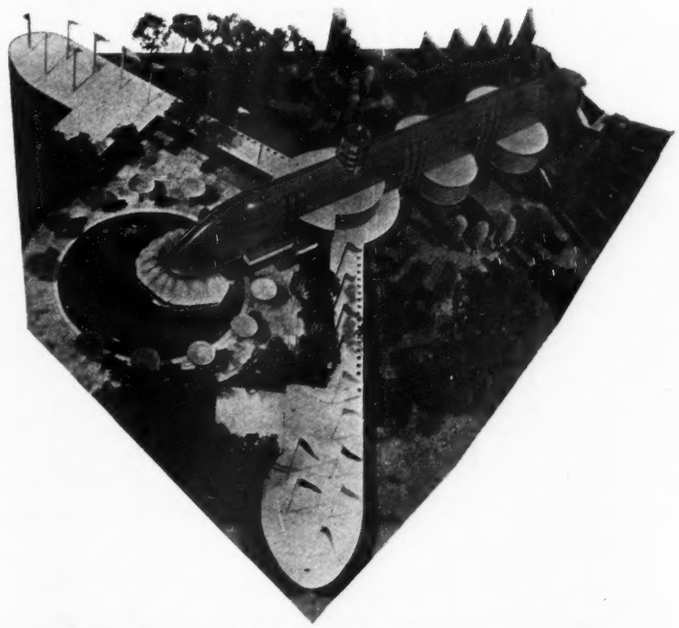
LIEBMANN BREWERIES, INC., serves its products in two restaurants. Rheingold Inn and Rheingold Terrace, and in two bars, all located in Sun Valley, a winter wonderland. The total investment in this entire area is approximately $500,000, and it covers about one and a half acres. There are exhibitions of skating and tobogganing in Sun Valley. Between the exhibitions, there is dancing on a floor which comes out over the ice rink.

F. & M. SCHAEFER BREWING CO.'s exhibit, "Schaefer Center," includes a 120-ft. open-air bar, the refrigeration and piping system in connection with which is in plain view behind glass. The history of beer from the time of the Phoenicians is depicted in a large mural. Inside the building are dining rooms with a capacity of 1,600.

NATIONAL BISCUIT CO. is showing "Mickey's Suprise Party" in a motion picture theater in the Food Bldg. No. 2. Continuous 15 minute programs are given before an audience of 266. An animated display of puppets by Tony Sarg is seen outside the theater. The exhibit emphasizes products, flavor and nutritional value.

NEW YORK STATE AGRICULTURAL EXPERIMENT STATION has an exhibit of "fruits of tomorrow" consisting of wax models of the most promising new varieties of fruits. "Plants of tomorrow" is another display, this showing how giant plants are produced by using colchicine to stimulate the chromosomes. Plant pests and diseases are pictured in transparencies, and displays emphasize the importance of bacteria in food processing and show how research aids the producer and consumer of dairy products.

There are displays pertaining to foods in many of the state and foreign nation exhibits.



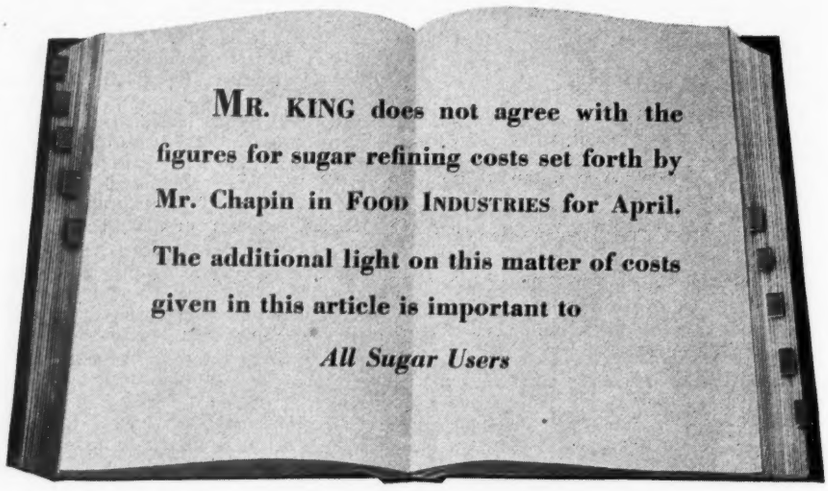
SWIFT & CO's building, in the form of a super-air-liner, symbolizes alertness and public service. In this building, the company demonstrates the manufacture of frankfurters, the smoking of ham and bacon and the slicing of bacon; new streamlined equipment is installed. A marionette show presents the latest merchandising ideas for benefit of retailers. Displays educate consumers on new recipes and tell how to use inexpensive cuts of meat. The building occupies 2½ acres, one of the largest sites at the Fair.

NATIONAL DAIRY PRODUCTS CO. has a three-part exhibit in a building of spectacular design covering 23,000 sq.ft. One part shows how the Sealtest System of Laboratory Protection insures the production and distribution of high quality milk and dairy products. Another part is devoted to the story of Sheffield milk, and includes a model milk pasteurizing and bottling plant. Ice cream, ices and sherberts also are manufactured. The third part of the exhibit promotes Kraft-Phenix cheese products, and machines demonstrate the packaging of Philadelphia cream cheese. A small replica of the Sealtest Kitchen in Radio City is included in the exhibit, as is a modernistic dairy-bar.

Still More About

SUGAR REFINING COSTS

By JAMES A. KING
Applied Sugar Laboratories, Inc.
New York, N. Y.


MR. KING does not agree with the figures for sugar refining costs set forth by Mr. Chapin in FOOD INDUSTRIES for April.
The additional light on this matter of costs given in this article is important to
All Sugar Users

IT was surprising indeed to see, under the signature of an engineer of R. S. Kent, Inc., such an array of statistical sophistries as appeared in the April issue of FOOD INDUSTRIES under the title of "There's More to Sugar Refining Costs." About the only point upon which E. E. Chapin, who wrote the article, and this writer are in agreement is the title. We endorse his statement that "there's more to sugar refining costs"; much more than Mr. Chapin has seen fit to disclose.

The major premise of Mr. Chapin was based on the recently published average spread between raw and refined sugar, prepared under the auspices of the United States Cane Sugar Refiners Association. Those figures show that, during the years of 1934 to 1937 inclusive, the average spread between the price of raw sugar and the price of refined sugar was $0.866 per 100 lb. Without having seen any of the figures used in the preparation of this average, we are willing to accept its accuracy for the purpose of this argument.

Referring to the Sucro Unit, the small refining unit now being marketed by the Applied Sugar Laboratories, and described in FOOD INDUSTRIES, January, 1939, p. 8, Mr. Chapin offers some hypothetical cost figures of his own, which add up to $0.6821. Mr. Chapin then deducts from the average spread between the price of raw sugar and the price of refined sugar ($0.866) the sum of $0.30 which, he says, is currently the differential between the price of granulated sugar and the price of the solids in sugar sirups. He concludes from these figures that the food manufacturer can buy sugar in sirup form from the refiner at $0.566 above the price of raw sugar and, thereby, save $0.11 over refining his own raw sugar in a Sucro Unit. He then concludes, in effect, that the unit is an economic impossibility. Mr. Chapin's "guessed-at" cost figures for the Sucro Unit are incorrect and we will deal with this later, but for the moment assuming that they were correct, his reasoning would still be fallacious.

The writer has been advised by the United States Cane Sugar Refiners Association that the average spread between raw and refined sugar of $0.866 is based on the average cost of raw sugar of all the sugar refiners who submitted figures (some did not submit figures) and the average weighted net selling price, f.o.b. refinery, of refined sugar. The f.o.b. price of refined sugar is calculated less freight absorptions. Thus, in arriving at this average figure, the spread of, say, a Philadelphia refiner who shipped sugar to New York would include the quantity shipped to that city, less from 15 cents to 22 cents per 100 lb. freight absorption. This would be precisely from 15 cents to 22 cents per 100 lb. less than the spread of the refiner in New York who marketed his sugar in New York City. And, likewise, the New York City refiner who marketed his sugar in Philadelphia would show 15 cents to 22 cents less spread.

If a food manufacturer in New York installed a Sucro Unit, he would be supplied with raw sugar at the same price as the New York refiner and would figure his savings not on a national average spread but on the spread of the New York refiner, which would be considerably greater than the weighted spread of all the sugar refined in the United States. This higher average spread will apply to most points in the United States, for the Applied Sugar Laboratories will ship raw sugar to the users of the unit from the most economical seaports from a transportation angle. Mr. Chapin makes the error of assuming that the average of a group of units will necessarily be true for the individual units that make up that group.

Now as to Mr. Chapin's synthetic cost figures for the operation of the Sucro Unit, we are in a position to submit here the cost figures of the actual operation of a typical unit now in operation in the plant of a food manufacturer. We exclude from these figures the freight on raw sugar and the freight on refined sugar as the rates are identical and they balance each other out. The figures submitted below have been checked not only by the cost accountant for the Applied Sugar Laboratories but also by the cost accountant for the customer. As a result of actual experience with the unit in operation, the figures prepared by Applied Sugar Laboratories in their prospectus appear conservative. The 5 ton unit now operating in the plant above referred to, although only a 5 ton unit, is producing from raw sugar consistently 7 tons, solid basis, of finished sirup in eight hours. This installation will probably be operated on a three shift basis, which will further reduce these costs.

The following is a detailed cost audit.

Cost of raws per 100 lb., duty paid		$2.85
Other costs:		
Premium for raws 97.5 deg.	$0.0617	
Warehousing, storage, weighing and loading	0.065	
Loss on process	0.0628	
Compensation — Applied Sugar Laboratories	0.10	
		0.2895
Manufacturing costs:		
Chemicals	$0.0675	
Filter cloths	0.0365	
Labor	0.0415	
Depreciation	0.03	
Maintenance	0.0055	
Steam and electricity	0.018	
		0.199
		$3.3385
Excise tax on 100 lb. sugar solids		0.5144
Cost per 100 lb. sugar solids		$3.8529

At the time when raw sugar was $2.85, the refined sugar move was at $4.40, less 2 per cent, or $4.312. In some few localities where sirup or liquid sugar was at all obtainable, the price was $4.10, less 2 per cent, or $4.018. Thus, there was a saving of $0.4591 against dry sugar and $0.1551 against liquid sugar. It must be borne in mind, however, that the majority of food manufacturers in the United States are not in territories where liquid sugar can be purchased.

Mr. Chapin, writing of the desire of manufacturers to save money on their sugar says, "The natural thing is to shop around for the lowest possible price and I am sure that $10 on a carload of sugar looks much greater to many purchasing agents than $10 on a gallon of flavoring." The manufacturer who will shop around to save $10 on a carload of sugar will certainly be interested in considering the installation of a Sucro Unit because, by these audited figures, it is apparent to him that he can save $45 a car of 30,000 lb. against liquid sugar and $135 a car against dry sugar.

In referring to the audited figures of the cost of operating the unit and in answer to some of the arguments of Mr. Chapin, the following items are not considered in the above: rent, insurance and taxes, supervision, water, interest.

Rent: The majority of manufacturing companies have sufficient dead space within their buildings and the installation of the unit would not increase the rent of the premises. Under these circumstances, if rent was charged to the unit, the manufacturer would show a gain in his other operations equal to the amount charged.

Insurance and Taxes: Insurance rates and tax assessments vary in different localities and the installation of a small unit such as this may not increase the present charges.

Supervision: The supervision of this unit does not add any costs for the manufacturer. If a charge is made for supervision, then a credit for an equal amount is reflected in the other operations.

Interest: In partnership accounting, interest charges on invested capital may be charged by agreement. It is not the general practice of corporations to charge interest on money invested in equipment. A charge of this nature would be offset by a credit for an identical amount reflecting as gain or loss.

The charges shown above for depreciation include the cost of installation. Depreciation over a period of ten years is conservative on the equipment comprising this unit and is generally accepted to be good accounting. The unit consists principally of tanks and a filter press. Incidentally, the actual cost of installing the unit was less than $1,000, and not $2,200 as indicated by Mr. Chapin.

The charge for wages covers the complete time of the operator and a helper. Many organizations having a floating labor gang may not need to increase their present payroll, but can utilize their present labor to operate the unit at a saving.

The lower cost for chemicals in this particular installation as compared to the cost indicated in the article on the Sucro Unit appearing in January, 1939, FOOD INDUSTRIES, is because of the fact that the customer's requirements are such that the liquid sugar can be slightly off color and not absolutely water white. If the liquid sugar was required to be water white, an additional quantity of chemicals would be required.

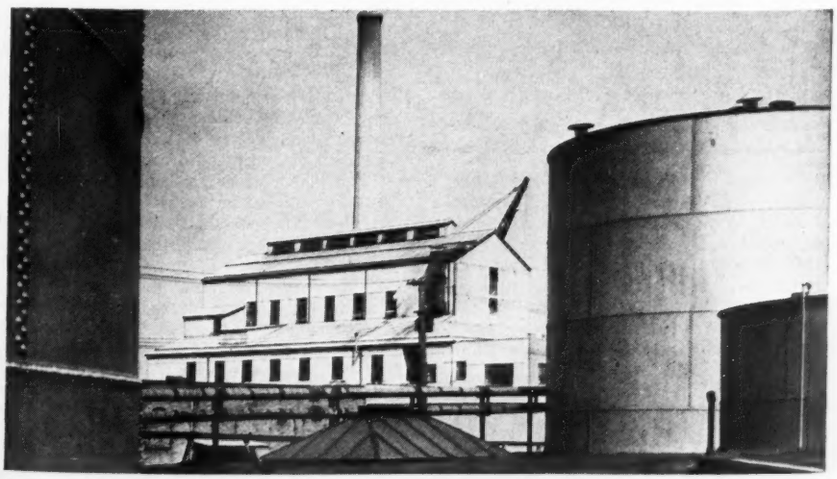
In Mr. Chapin's article, he makes some cynical observations concerning the use of vegetable carbons and bleaching processes (Sucro-Blanc) in the refining of sugar, comparing them with the older methods of using bonechar. Little is to be gained by going into a detailed comparison of costs of manufacture of sugar under these various processes or the very much smaller capital cost per unit of production of erecting either a vegetable carbon sugar refinery or a Sucro-Blanc sugar refinery. Suffice it to say that, in the last ten years, 42 sugar refineries have been built in the Western Hemisphere, located as follows:

Canada	1	Venezuela	2
United States	8	Mexico	3
Cuba	14	Peru	2
Argentine	5	Chile	1
Colombia	2	Haiti	1
Puerto Rico	3		

Of these 42 new refineries of approximately a total daily capacity of 8,200 tons of refined sugar (the combined daily capacity of the sugar refineries in the Eastern Seaboard of the United States is 14,000 tons per day), 23 are vegetable carbon plants, 19 are Sucro-Blanc, and not one is a bonechar plant.

As to the question of the successful operation of vegetable carbon sugar refineries, we can only refer with intimate knowledge to our own refinery in Brooklyn, N. Y., the Sucrest Refinery. This refinery has been in operation during three of the worst years in the sugar refining industry and has shown a profit each year, which is more than can be said for a number of the bonechar refineries.

To go into a long discussion as to relative costs of sugar refining would serve no purpose in this short article, but, as the trade well knows, the Sucrest Sugar Refinery is open to anyone who is interested in our process, also several Sucro Units are open for inspection. We have no secrets and not only is anyone contemplating the building of a sugar refinery welcome to spend as much time as he desires in our refinery but we will be pleased to go into costs of construction as well as costs of manufacture.



Sucrest refinery in Brooklyn, N. Y., as seen from the sugar sirup and molasses tanks

Canners Standardize Fruit and Vegetable Cans

Number of can sizes for fruits and vegetables greatly reduced by action of National Canners Association

FRUITS and vegetables will be packed in a very limited number of can sizes under the new set of standards fixed voluntarily by the membership of the National Canners Association. Seventeen can sizes will account for about 92 per cent of the number of fruit and vegetable cans. An additional sixteen sizes are required for certain special commodities requiring peculiar dimensions or unusually small containers. The total of 33 sizes of cans is in striking contrast with the practice reported last year, during which at least 155 can sizes were used for fruits and vegetables.

The preliminary survey made by National Canners Association quickly disclosed that a vast majority of all canned goods were put into a very limited number of sizes of containers. This greatly simplified the selection of those which were needed for each sort of goods. The accompanying table shows the dimensions and the characteristics of the resulting set of standard cans for 30 vegetables and 23 fruits. This list of 33 items would be even more brief had it not been for certain specialties like pimiento, mushrooms, vacuum-pack corn, long pineapple spears, and other kinds of goods, the nature of which makes necessary either odd shapes or special small sizes. The sixteen novel sizes required are in each case used for only a single commodity; but for that commodity each appears to be almost a necessity.

For each particular commodity there has been selected by the industry a limited number of sizes which will appropriately accommodate all the needs for that particular sort of goods. Typical of these selections for fruits is the group 8Z Tall, No. 1 Tall, No. 2, No. 2½, and No. 10. This combination of five sizes is used for nine important varieties of fruits, including peaches, pears, plums, etc. The most elaborate grouping of sizes is for pineapples, a result of the fact that this fruit must be packed in various forms, slices, crushed, spears, etc. For pineapple the nine sizes indicated are: 8Z Tall, No 211 Cylinder, No. 1 Tall Pineapple, No. 1 Flat, No. 2, No. 2XT, No. 1½, No. 2½, No. 10. In contrast with this elaborate group the needs of blueberries appear very simple as only two sizes of cans are needed, No. 2 and No. 10.

In a like manner there is a similarity between the various sizes chosen for the fruit juices and some similarity in the choices for various vegetables. However, there is quite a variety throughout the list as the recommended dimensions chosen for each individual product have been made to conform as closely as possible with existing practice, to lessening the initial expense for standardization.

It will be noted that the 307 by 409 size, commonly called the No. 2 can, is the same in dimension whether it be for one or another of the commodities. The capacity of the can shown in the tabulations as ounces of "volume fill" of course refers to the space within the can, expressed in fluid ounces of water which the can might contain. It has no connection with the number of ounces of goods expressed in avoirdupois ounces, which must be printed on the label to indicate to the purchaser how much of the commodity he gets for his money. The fluid ounces of space are the same in any can of a given character, though the actual quantity of goods will necessarily vary in weight according to the density of the material in question.

It is expected that the promulgation of these simplified standards by the government officials will insure proper attention generally. Ultimately, any needless departures from size standards may become a question of "unfair trade practice," if matter of deception or sharp dealing between competitors appears to be involved. However, the industry hopes that the acceptance of these standard size recommendations will be so general as not to necessitate any disciplinary action by public officials.

IT is hoped also that this very practical workable approach may eliminate the feeling among certain congressmen that there is any need for the Sommers Bill, which has proposed that all kinds of canned goods should be packed into twelve named sizes of containers. The industry well knows that freezing of standards, by putting them into a Congressional act, would be most unfortunate since it would not provide for any easy improvements as progress in the canning art might make desirable. They argue, apparently with full justification, that this voluntary choice of standard sizes accomplishes every purpose claimed for the Sommers Bill, and with a much less costly and more workable plan.

In utilizing the can standards it is important to note that the dimensions are expressed in terms of inches and sixteenths of an inch. A can described as 211 by 304 is 2 11/16 in. in diameter by 3 4/16 in. tall. It is recognized that some tolerance in the dimensions is necessary because of various methods of can filling and closure. In actual practice it is expected that the diameter of a standard can will be maintained as close to the exact dimension indicated as is possible, and that the necessary variation in dimension will be made in the height only. Such tolerance should, however, be very small, usually within 1/16 in.

Other users of cans of a character similar to those employed in packing fruit and vegetables will be encouraged by can makers to use these standard sizes also. To do so will reduce the need for special dies and modified machines. It will permit more prompt delivery of cans from stocks held by can makers. It will reduce costs to all. Naturally, such support of the simplification program is hoped for by fruit and vegetable canners.

National Canners Association in announcing the standards emphasizes two important advantages. From the standpoint of the purchaser of canned goods, the simplification will insure that cans which look alike are actually of the same size. Thus the chance of unintentional deception and unfair comparison between two makers of canned goods is eliminated. In the second place, the cost of making the cans and the cost of cartons and boxes is reduced to a minimum.

Standard Can Sizes For Fruits and Vegetables As Designated by National Canners Association

Can Name	Volume Fill [a] Fluid ozs.	Dimensions [b] Diameter		Height	Number of Commodities for Which Recommended
2Z Mushroom	3.36	202		204	1
6Z	5.59	202		308	9
5Z	4.52	211		200	2
Small Cranberry	5.56	211		206	1
4Z Mushroom	6.60	211		212	1
8Z Short	7.30	211		300	1
8Z Tall	7.99	211		304	19
No. 1 Picnic	10.06	211		400	20
No. 211 Cylinder	12.48	211		414	6
Pint Olive	15.62	211		600	1
4Z Pimiento	3.88	300		108	1
7Z Pimiento	6.89	300		206	1
8Z Mushroom	12.49	300		400	1
No. 300	14.00	300		407	13
No. 1 Tall (pineapple)	12.90	301		400	1
No. 1 Tall	15.36	301		411	16
No. 303	15.53	303		406	15
No. 303 Cylinder	20.11	303		509	4
No. 1 Flat	8.18	307		203	1
No. 2 Vacuum	13.54	307		306	5
No. 2	18.91	307		409	43
No. 2XT	22.58	307		506	1
No. 2 Cylinder	23.71	307		510	5
No. 2 Tall	26.52	307		604	1
Quart Olive	31.04	307		704	1
No. 1½	13.30	401		207.5	1
No. 2½	27.41	401		411	34
No. 3 Vacuum	21.96	404		307	2
No. 3 Cylinder	47.51	404		700	6
No. 5	54.23	502		510	3
No. 10	100.68	603		700	53
No. 1 Square	15.89	300	308	308	1
No. 2½ Square	29.87	300	308	604	1

[a] Fluid ounce fill, or volume of net contents, is the controlling factor in designating the cans recommended for use. In most cases the dimensions listed in this table (diameter and height) describe a can that will permit the minimum fill prescribed. If for any reason a can of the prescribed dimensions will not accommodate the prescribed volume fill, a tolerance will be allowed in the height sufficient to permit the attainment of the prescribed volume fill.

[b] In the statement of each dimension, the left hand digit gives the number of whole inches, and the right hand digits give the additional fraction of the dimension expressed in sixteenths of an inch. Thus, 211 x 400 means that the can is 2 11x16 inches in diameter and 4 inches high.

What Is Satisfactory Carbonation?

Bottlers should regulate carbonation to give right amount of "pop" on opening, enough sparkle on dispensing, reasonable life on standing and sufficient tang on tasting.

By JOHN M. SHARF [1]
Technical Service Director, American Bottlers of Carbonated Beverages
Washington, D. C.

▶ ***Practical data on factors affecting the important characteristics of carbonated beverages are presented in this article, these data being based on careful research. The principles involved in manufacturing a carbonated beverage so that it will be at its best at the moment of consumption apply to***

Brewers
Bottlers of mineral waters
Manufacturers of soft drinks

IF any one of the consumer appeal characteristics of a carbonated beverage is over-emphasized, one of the others is likely to suffer. In general, over-carbonization is as serious as under-carbonization, because of the excess "load" on the beverage, causing "wildness." Few carbonated waters are of a type that carry more than 4.5 volumes of gas, with many very suitable at gas contents nearer 4 volumes. Very few flavored beverages used for mixing purposes behave well with gas contents as high as carbonated water, and usually are found near 4 volumes. Beverages meant to be drunk directly from the bottle behave best with carbonations in the range of 3.5 volumes, and so on down to the pulpy type beverages and those in which less pungency is desired with the least amounts of gas.

When the pressure of the carbon dioxide gas is only that of the atmosphere, the gas dissolves in amounts determined by the temperature of the water. At freezing temperature the gas dissolved will be 1.71 volumes. At 100 deg. F., 0.56 volumes. This important observation indicates that the ability of the water to take up the gas decreases to a third as the temperature goes from freezing to that of a hot day, and that if we want to get more carbon dioxide dissolved at a given gas pressure we should cool the water. Approximately 40 deg. F. cooling of the water will double the amount of gas which will dissolve.

To get greater amounts of carbon dioxide into solution, it is necessary to increase the pressure of the gas on the water. Every time the gas pressure is increased by 14.7 lb. per square inch, the gas content increases one multiple of that at atmospheric pressure, for a given temperature.

In practice, the amounts of gas wanted are such that pressure is needed. And by such process, the gas is placed in a "tension" in the liquid. When the pressure is removed, as when a bottle is opened, the gas moves out of the liquid until it is back to the conditions existing before the pressure was applied.

Of great importance to bottlers of carbonated beverages is the effect that varying degrees of carbonation have on the finished product, its appearance, taste and general behavior. The maximum acidity developed by the carbon dioxide in solution (between a pH of 3.4 and 3.1) is reached in the carbonation range of 2.5 and 3.5 volumes of gas. It has also been observed that this same range gives a maximum pungency and taste sensation. Depending somewhat on the type of beverage, carbonations much above this range tend to throw off too much carbon dioxide in the mouth and throat, causing choking or irritation.

The amounts of carbon dioxide lost as a beverage is dispensed depend on whether the product is drunk from the bottle or poured into a glass. If taken from the bottle, the gas loss is negligible when the bottle has been cooled and not unduly shaken, with the result that such beverages should have moderate carbonation. When the beverage is poured, the agitation tends to throw the gas out of the liquid. As long as the gas loss in pouring does not become so great that the resulting beverage has dropped below the reasonable taste range and become dead, it is not wasted, for the bubbles formed furnish a direct eye appeal.

Once the beverage is placed in a glass it should have at least enough carbonation to show some life during the period in which the beverage is being drunk. If it is mixed with other liquids which are not carbonated, they will absorb some of the gas from the beverage and will thereby tend to dilute and lower the average carbonation. In general, it has been found that, if the beverage is finally quiet in the glass after the disturbance of dispensing with from 2.5 to 3.5 volumes of carbonation, it will not be lifeless. Attempting to get more than these amounts in the glass is not feasible.

TWO other factors are important because of consumer demand for them. The first is a degree of "pop" or gas escape as the bottle is opened, which signifies that the bottle is "alive," but this "pop" must not be so great that the product "boils over." The second is that the bottles should have a good life when allowed to stand open.

The carbonation should be adjusted so that there is the proper amount to give the desired characteristics to the beverage on: (1) opening (removing crown); (2) dispensing (pouring from bottle); (3) standing (life in glass); (4) tasting (pungency).

Considering all these factors together, we must first realize that the amount of carbon dioxide that can be put into the beverage is not unlimited, and that this gas must be distributed among these several factors to obtain the best balance.

(Turn to page 293)

[1] From a talk given at a special meeting held in conjunction with 20th annual meeting of American Bottlers of Carbonated Beverages.

Profits From BYPRODUCT RECOVERY *Depend Upon Products Made*

Part II

Crude milk sugar recovered from whey can be refined into U. S. P. lactose

By W. E. STRINGER
Sheffield By-Products Co., Hobart, N. Y.

► ***As was shown in Part I of this article, in FOOD INDUSTRIES, February, 1939, profitable use of whey depends upon the byproducts recovered. Crude milk sugar and poultry feed proved to be a suitable outlet for all whey solids. In this installment, it is shown how the crude milk sugar can be further refined to produce a more valuable product—pure lactose. This information is important to:***

Butter Makers
Cheese Makers
Milk Plants
Food Engineers
Food Technologists

CRUDE milk sugar production, combined with the production of poultry feed, as a means of profitably using all the solids in whey, was discussed in FOOD INDUSTRIES, February, 1939, pages 72 to 74. As noted in that article, the crude milk sugar produced from the process there outlined is a dry product, suitable for storage and use as such. It also can be refined into U.S.P. lactose, or pure milk sugar by the removal of small amounts of milk salts, protein and coloring materials. A chemical treatment is used to remove the milk salts and protein, while the color is removed by treating with decolorizing agents.

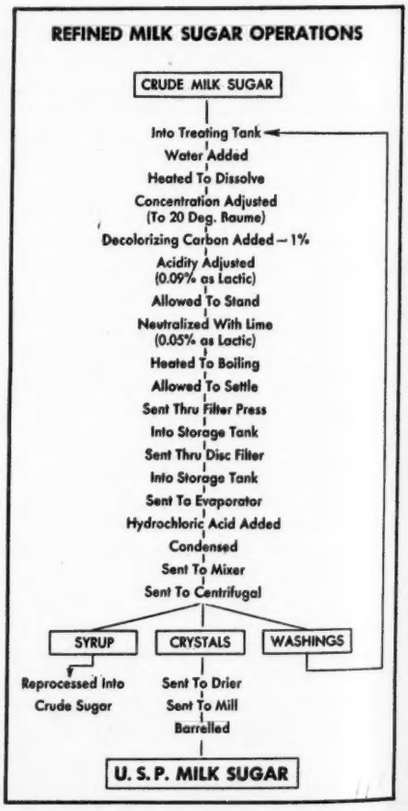
To carry out these operations, the crude milk sugar is placed in an iron treatment tank with a suitable quantity of water. Steam is admitted to this tank from a perforated steam pipe in the tank bottom. This heats the contents until all the milk sugar crystals are dissolved. Concentration of the solution is adjusted to 20 deg. Baumé, equivalent to about a 30 per cent sugar solution. This is adjusted by addition of correct amount of crude milk sugar, and the desired specific gravity of the solution is obtained by testing a sample of the solution with a hydrometer.

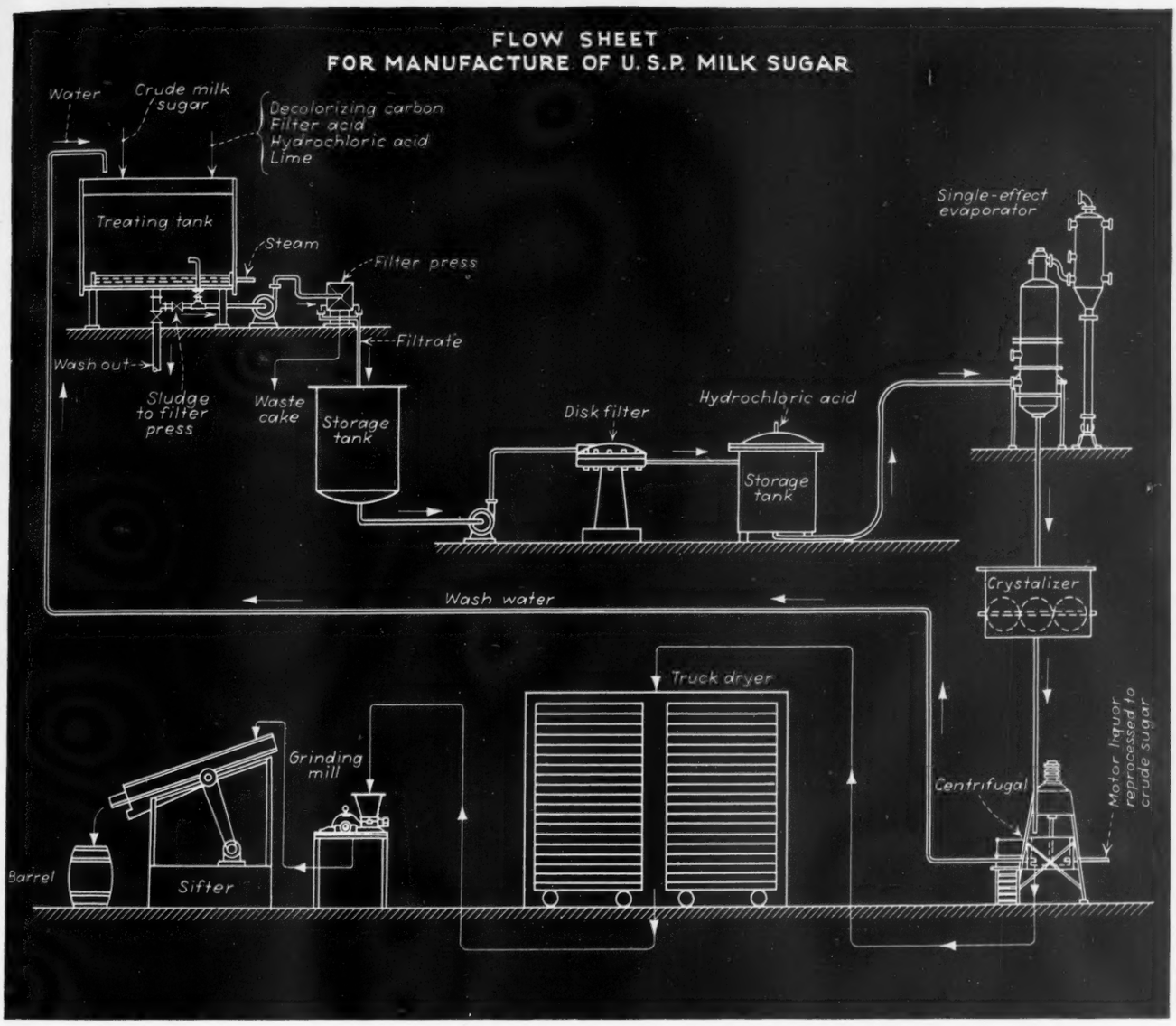
At this point, a decolorizing carbon paste is added. It consists of 3 parts of bone black, 1 part of Norit, 1 part of hydrochloric acid, and enough water to make a paste that is easy to handle. About 1 per cent of this paste is added to the sugar solution, based on the weight of milk sugar being used, that is, 1 lb. of decolorizing paste is used for each 100 lb. of milk sugar dissolved. At the same time, filter aid is added, the amount being about one-quarter the weight of decolorizing paste used.

After boiling the solution containing the decolorizing carbon, its acidity is adjusted by adding hydrochloric acid until the acidity tests 0.09 per cent as lactic acid. Using hydrochloric acid in this way aids in the conversion of the milk salts into soluble chlorides, which can then be removed in a subsequent washing operation. Also, the hydrochloric acid aids in what is called a "salting out" effect on the proteins. This is accomplished later by lime, which converts the soluble proteins into insoluble forms, so that they can be removed by filtration. The addition of the acid also aids the carbon to absorb impurities and to effect decolorization.

After the addition of acid in the correct amount, milk of lime is added to the solution in the treatment tank. This is added in an amount sufficient to neutralize the acidity to a point where the solution tests 0.05 per cent acid as lactic acid. This neutralization must be carried out with great care, so that over-neutralization does not occur, as that would result in "burning" or, in other words, a tendency towards caramelization of the sugar.

After the addition of the neutralizing lime, the batch is boiled vigorously, to effect as complete coagulation of proteins as possible. Next, the batch is allowed to stand so that coagulated matter settles to the bot-





tom. At the same time, a more complete absorption and decolorization action by the carbon takes place.

In this latter connection, it has been found that a long period of contact of carbon and sugar in solution aids greatly in the decolorization and production of a water-clear solution. For this reason, wherever possible, the procedure has been to treat the crude sugar up to the point where the carbon was added, and then to allow the resulting mixture to stand over night. On the following morning, the mixture is again heated and the lime treatment carried out.

Next, the milk sugar solution is passed through a filter press. The filtrate from this filter press goes to a storage tank, and the filter cake goes to waste.

While the filtrate from this first filtering is a water-white solution, it is filtered again to insure purity. The second filter is of the disk type, consisting of two perforated copper disks between which is placed a very fine mesh rag-paper filter. Anything that may have passed through the cloth filters of the filter press is removed from the solution by this disk filter.

From the disk filter, the solution goes to a second storage tank, this time a closed tank. It is drawn from this tank to a vacuum evaporator for concentration. Just before the last of the batch of sugar solution enters the evaporator, one quart of 32 per cent hydrochloric acid is added to the contents of the closed storage tank and pulled into the evaporator with the batch. This is done to make sure of the conversation of all of the milk salts into soluble form, as well as to insure that any remaining proteins be in soluble form, to permit their removal when the sugar crystals are washed.

The concentration of the pure milk sugar solution is carried out in the evaporator, just as described for the crude milk sugar solution in the article in Food Industries for February, 1939, already referred to. The use of the mixer, centrifugal washer and tray dryer are also the same for pure milk sugar as for crude milk sugar.

In the matter of wash water, however, the procedure is different. The first, or mother, liquor thrown from the centrifugal is proportionately high in impurities, so it is returned to the crude milk sugar operation, to be converted to crude milk sugar and poultry feed. The remainder of the water thrown from the centrifugal, which can be rightfully called wash water and not mother liquor, is returned to the treatment tank described in the second paragraph of this article. There it is used for dissolving the crude milk sugar which is to be refined into U.S.P. milk sugar.

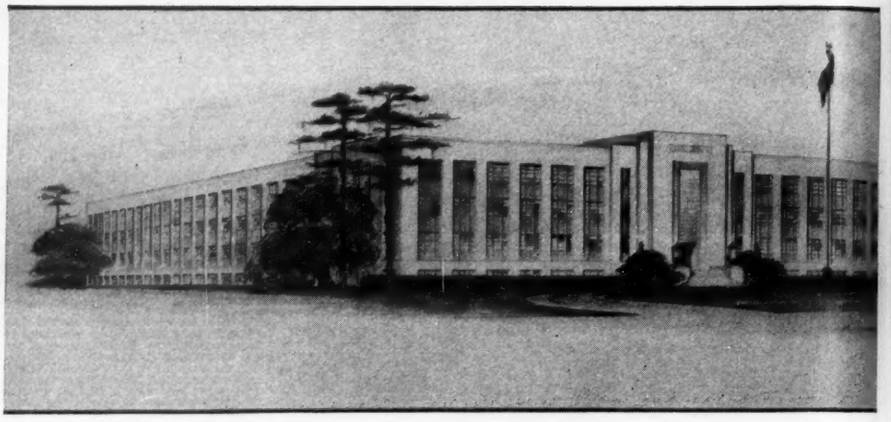
Because of the procedure outlined, the wash water used in refining each batch of sugar is uniform in nature. Since each batch is brought to the same concentration (20 deg. Baumé) before treatment, it is possible to use a uniform procedure in the treatment of all batches. This helps to give a uniform finished product.

Each batch of sugar, as it comes from the centrifugal, is tested to make sure that it has been properly washed. This involves observing the clarity of

(*Turn to page 290*)

Research Laboratories Planned For New Agricultural

Government undertakes to speed up industrial uses of agricultural materials by big Federal research program



An Editorial Staff Interpretation

NEW and enlarged use of agricultural materials by industry is needed. Any critical student of the agricultural problem knows that the way in which farmers can best be served is to give them new markets. That would be real and permanent service to the cause of agriculture, not a mere headache tablet or political salve for present discomforts.

The food industries are very largely interested in one of the latest and most important moves in this direction. This is the establishment of four new Regional Research Laboratories of the Department of Agriculture. Each will do fundamental scientific and engineering studies for the discovery of facts on which enlarged industry may be built. This constructive type of farm relief was recognized in the Agricultural Adjustment Act of 1938 and supplemented shortly thereafter by the authorization that the Secretary of Agriculture might allocate $4,000,000 a year to such research, much of which is necessarily also significant for those in food research.

After an extended field survey, the Department selected four sites for the new laboratories, which are now being designed and will shortly go under construction near Philadelphia, New Orleans, Peoria, Ill., and Berkeley, Calif. At each of these locations, a building somewhat like that shown is to be erected. And in each laboratory a scientific staff is to be organized for work appropriate to the district.

By law, these laboratories will deal primarily with those crops that are most largely in surplus and for which this type of research may offer some constructive aid. The Northern Laboratory will deal with corn, wheat, and the wastes of agricultural production like straw, cobs, stalks, and other unused products of farm activity. Naturally this type of work will include fundamental studies on starch and the ways in which other products than food may be made from the cereal grains. But as explained below, the food aspects of these developments must not be overlooked.

IN the Southern region, cotton is the agricultural commodity of first concern. Novel uses of it, including applications other than for textiles, will be emphasized together with studies on various kinds of cellulose derivatives. In addition, the New Orleans Laboratory will tackle the problems of peanuts, cottonseed, and the vegetable oils derived from them and from other agricultural materials. It will also try to see what can be done with sweet potatoes.

In the Far West the new undertakings of the laboratory will be closely related to fruits and vegetables, but will also study the Western wheat problem and byproducts of food processing, especially cannery wastes and nuisance problems. Alfalfa and potatoes, both important Western surpluses, will also have some attention at the Berkeley Laboratory.

IN the East the surpluses of apples, potatoes, and various truck crops, as well as tobacco and dairy products, will be first on the list for investigation. In fact, the Philadelphia Laboratory may find itself deeply involved in many novel projects peculiar to the smaller crops which become critical because of high seasonal peaks of production, rather than because of the great quantity of the surplus.

The Department of Agriculture has been considering these problems from the standpoint of the long-time benefit to agriculture which might come from useful research results. It has been made evident to it that developing some new food from surplus raw materials would be much less advantageous to the farmer than would be the development of non-food products. A new food might largely substitute for an old one and thus merely shift the consumption of the eater from one crop or one kind of food to another. Non-food uses, on the other hand, are likely to be such as to be added to the present food uses. If so, the non-food use gives actual relief from surplus, and not merely transfer of consumption from one farm commodity to another farm commodity.

Development

Architect's sketch of regional laboratory at New Orleans. The three other regional laboratories will be similar in general layout.

A number of critics on Capitol Hill during recent discussions have pointed out that they expect some of the largest benefits which may come early to be in the field of better food utilization. Therefore, the new regional laboratories may work on some of the food problems, as well as on the more important new non-food uses for agricultural materials.

THE policy of the Department is going to be to put the results of its research before all interested parties at the earliest possible date. Research men of the food industries will be welcomed at all times by the staff of the new laboratories. If an industry can see in the work of the Government some suggestion on which it may develop new commercial activity, the Department men will be very happy to have their results so utilized at the earliest possible date. It appears, in fact, that the measure of success of the new laboratories will be determined by the way in which they get their results actually into commercial practice.

As a part of the first year's work, now in progress, the Department of Agriculture has made an extended survey of all the research now in progress under governmental, state, college, private institution, or commercial laboratory sponsorship. In all except commercial cases it is believed that a fairly complete report has been gained as to the scope and purpose of present undertakings which deal with the processing of agricultural raw materials. Sometime this spring it is expected that the Department will issue an elaborate report of this survey. And it is planned by the Department that that report shall include an outline of the initial program to be carried out in the new laboratories. The research men of every food company in the country are expected to study that document eagerly when it is released, because it may contain many suggestions of direct commercial significance.

Among the suggestions made to the government men during their survey were many which dealt with projects which might be undertaken but which are not now active at the institutions from which the suggestions came. Those, too, will be found in this report of the Department to Congress when it is issued. They will indicate what some of the best research leaders think might well be done if the money available for experimentation under their own direction were increased. A study of those suggested problems may perhaps afford the research directors of food companies some good clues to new products and new possibilities in their areas of interest. And it is certain that many of these suggestions will relate to byproducts or control of wastes of present food industry.

Discussion of this subject with the investigators of the Department of Agriculture makes it clear that one of the types of study which will have first attention will be waste elimination and new byproduct development. It is proposed, for example, that in the Western laboratory a careful survey be made of the kinds of unused materials which are available from present food processing plants. And this study may well include an investigation of what is the chemical and physical nature of these present wastes. That, it is hoped, may lead to new uses or new byproducts. At least it will lead to a better knowledge of the character of the waste materials, and can guide those who are responsible for waste disposal in order to enable them to avoid maintaining a nuisance.

THE technical staffs for the new Research Laboratories have not yet been organized, but it is hoped that key men to serve as leaders of some of the major research projects will be appointed before long, certainly by midsummer. Thus far only the general administrative staffs and specialists to care for design, construction, and equipment of laboratories have been named.

The chemical and engineering projects which will form the nucleus of all the scientific and development work at the new laboratories will be under the general administrative direction of Dr. Henry G. Knight, chief, and Mr. Horace T. Herrick, assistant chief of the Bureau of Chemistry and Soils. Under Mr. Herrick there will be a general staff for coordination and four independent technical groups, one at each of the laboratories. Four men have been named as directors of the four laboratories. The project leaders to be chosen from lists of eligibles now being established by the Civil Service Commission procedure will work immediately under these directors.

ANY food industry or any association of food companies which has particular problems that it would like to have considered by these new government units should take up these questions in due time with the technical organization most directly interested. Detailed plans for the first research undertaking will be formulated by the senior project leaders during the balance of this calendar year while the buildings are being erected. There will be convenient opportunity, therefore, during the next few months for members of the food industry to discuss these questions with the government specialists. Any research man in doubt as to where to make a first contact can appropriately communicate with Mr. Herrick at the Washington headquarters of the Bureau of Chemistry and Soils. Through his office any queries and suggestions will be promptly routed to the specialists who are most directly concerned with the subject in question.

One of the most serious remaining difficulties with respect to this organization is the question of proper procedure to gain the maximum speed without destroying the effectiveness of research. Those responsible for general direction well appreciate that anyone expecting marvelous immediate results from this experimentation is foredoomed to disappointment. Despite the pressure from Congress to get the maximum speed, every effort is to be made to keep the undertaking on the highest practical level of real scientific and sound engineering investigation.

Altogether the effort will be to deal in a constructive fashion and to cooperate with industry, avoiding political and expediency pitfalls so far as any governmental undertaking is able to do this.

Flour Consumption Figures Show Trend to Bakeries

Housewives and "other industries," however, still account for more than half of the flour consumption

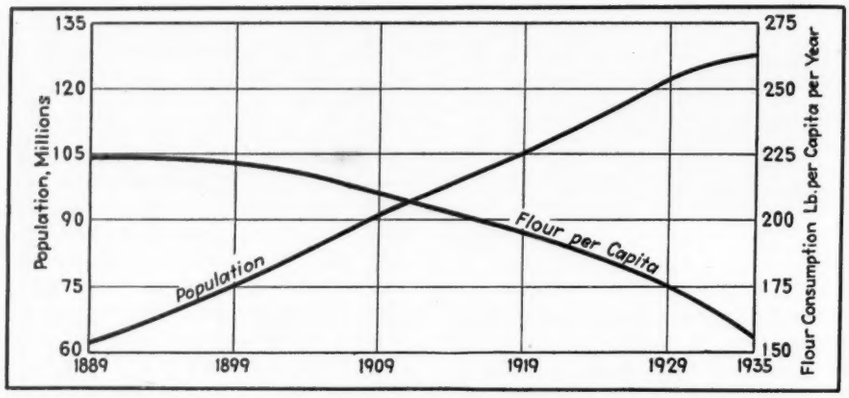
By E. G. MONTGOMERY
Chevy Chase, Md.

DURING the past 50 years, there has been a continuous upward trend in the amount of flour used by bakeries in the United States. In 1889, home-made bread was the rule, not the exception. In that year, the per capita consumption of flour was 224 lb., of which the bakeries used only an estimated 8 per cent or about 20 lb. per capita. By the year 1935, the figures (which are the latest available) show a per capita consumption of only 155 lb. of flour. But of this amount 43 per cent, or 65 lb. per capita, was used by the bakeries.

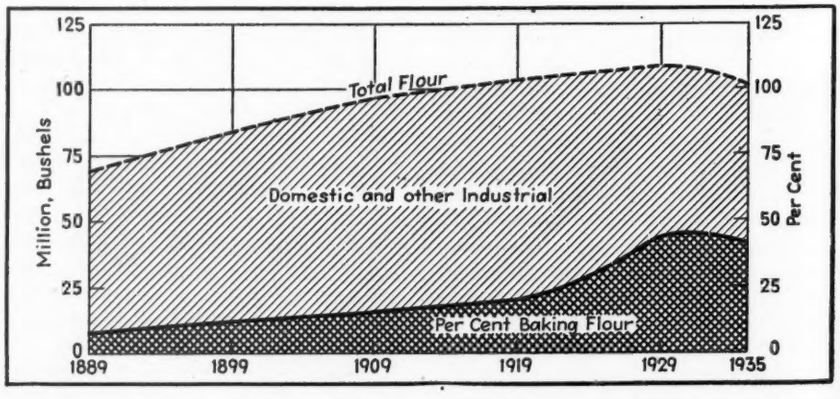
The greatest growth in the bakery industry took place between 1919 and 1929, during which years the volume practically doubled. After 1929 the increase continued, but at a slower pace. Since 1935 conditions have been comparatively stable, with perhaps a slight increase in flour consumption by bakeries.

Although the shift in baking from the kitchen to the factory has been notable, housewives and "other industries" still consume more flour than do the bakeries.

Baking bread in factories has relieved the housewife of a tedious, exacting and difficult job. In contrast, the improvement in kitchen equipment, and the development of self-rising and other prepared flours, has simplified the problems of home baking.



Flour consumption per capita compared to growth in population



Trend in flour consumptions in bakeries compared to total flour consumption

Year	Value of Bakery Products (000,000 omitted)	Chicago Cash Price No. 2 Hard Wheat	Value of Bakery Products Revalued by Price of Wheat	Bakery Flour Used in Million Bbl.	Total Flour Used Million Bbl.	Per Cent in Bakeries	Bakery Flour Per Capita in Lb.	Bakery Flour Per Capita in Per Cent
1889	$128	$0.81	$160	6[1]	70	8	19	8
1899	175	0.68	260	10[1]	84	12	25	11
1909	396	1.09	360	15[1]	97	15	31	15
1919	1,151	2.27	507	20[1]	103	19	39	20
1929	1,526	1.30	1,173	47[2]	108	43	77	44
1935	1,235	1.04	1,200	43[2]	101	43	65	42

[1] Estimated.
[2] Census.

Future trends in this competition between the home and the factory for the privilege of baking the nation's bread cannot be predicted with certainty. However, trends may be indicated by the accompanying table and charts, which show some of the developments in the use of flour and production of baked products that have taken place in the past.

More Mistakes To Avoid in Packaging

PART III

EDITOR'S NOTE: ***This series will run for several months until it is completed.***

EVERY EXAMPLE is based on actual errors of packaging. Publication of the negative aspects of packaging is frequently more informative than the mere statement of a bunch of rules to follow. Particularly is it important to bring out the reasons why, and the automatic penalties that develop because of making mistakes.

130 **Lengthy Research—Skimpy Design**—A disheartening experience for the package designer and supplier is to see the manufacturer spend literally months on product research, and then only a few hours on package design. The case in point has arisen with the manufacturer of a new type of product which was developed only after many months of factory research. Because of the manufacturer's anxiety to get the new product on the market, it was packaged in a set-up box, done in ivory and blue, with nothing on it to indicate, other than name identification. In no way did this advise the consumer what was in the package or any of the inherent qualities or advantages which it possessed.

131 **Concentrated Product: Ruined Caps**—A packer had been putting out a product for a considerable length of time, when he decided to make it more concentrated. But he failed to take into consideration the effect of the more concentrated product on the closure being used. The new concentrated product was much too strong for the liner in the cap, and they experienced much grief until the true cause of the trouble was discovered.

132 **Opening Too Small**—The product was a hygroscopic powder which is measured out by the teaspoonful by the housewife. It is always packaged in tin containers. To facilitate consumer convenience, a new type opening was designed to permit inserting a teaspoon, loading it with the powder, then scraping off level on withdrawal by a straight side of the opening which was shaped like a half-moon. The idea was splendid but after the new package was distributed it was discovered that about one-third the housewives of the land were using teaspoons too large to go into the hole, which a mere man had decided was big enough.

133 **Bottle Necks Were Too Long**—The manager of the bottling department of a branch plant received a large amount of glass, the design for which had been approved only by the sales department in the New York office. When he came to fill the new bottles, he found that the filling height (distance from the top of the bottle to the liquid level) was too great to be filled accurately on any of the filling machinery which he had available. The neck of the bottle was too long.

In order to be able to change one of his machines to handle the new bottle, a new set of 18 extra-long filling valves would be required; also the whole machine would need to be disassembled in order to install a special cam track. As this would have involved expense and delay, the glass on hand was filled by the existing machine, in fact, over-filled with a very expensive product. The excess fill was sheer waste in a very considerable amount.

Then the bottle was redesigned.

134 **Consumer Complaints**—Suggestions given by my students are: that olive bottles are too tippy; that corks in essence bottles cannot be easily withdrawn; that maple syrup is sold in gallon pails which are too large a quantity for a family to use, and often results in spoilage.

135 **Used Wrong Paper**—Here the complaint was that a bag-sealing machine was discoloring the bags as they passed through the machine. It was found that the food manufacturer had purchased bags made from a dyed paper instead of a printed paper as used at the time the machine was installed. The adhesive remained the same. It so happened that the adhesive possessed some ingredients which acted on the dyed surface so that it was discolored after it came out of the machine. The food manufacturer did not realize that this adhesive on a dyed paper would react differently from the same adhesive on a printed paper.

136 **Machine Cleanliness: Essential**—In cases where one wrapping machine is used in connection with two or more different wrapping materials, the correct practice is to properly clean the machine before a changeover is made. This procedure will not only preserve certain operating units, but will result in maximum operating efficiency.

137 **Misconceptions of Moisture Losses**—In connection with those packages which contain moist and perishable products such as quick-frozen foods, there is a rather wide technical misunderstanding to the effect that escape of moisture from wet moisture (that is, in liquid state) in a package is through holes or lack of perfect sealing of the joint. Experiments made several years ago by our company on such packages proved beyond any doubt that moisture loss from a package escapes only in a trifling degree through cracks and cells.

The major escape of moisture is by diffusion through the packaging material itself.

Unless the package is by nature intended to be hermetic and to withstand positive and negative internal pressures caused by variations in temperature and barometric pressure, it is useless to try to shut off all escape by sealing all cracks and holes, because even one pinhole is sufficient to prevent the development of either plenum or vacuum.

Furthermore, the behavior of vapor in a package is capable of causing surprises, because even the package itself may be the equivalent of a room and moisture can travel about from one place to another inside the package, just as it does inside of a room.

We found many years ago that packaging material may be quite thirsty and then though the package as a whole may not change its weight, moisture may shift from the content to the material of the package itself. For the water content of the package itself is not in equilibrium with the interior atmospheric humidity. Also, in this same category is the evaporation of moisture from wet or frozen content and condensed in a form of ice crystals on the interior of the wrapping material.

138 **How to Develop Speed**—It is desirable to keep the neck openings of bottles as large as possible. The larger the opening, the larger the filling valve can be made, and still have sufficient clearance. With larger valves higher output per valve is obtainable, and a greater filling capacity is obtained with the same investment in equipment.

139 **Failed to Provide Accessories**—Failure to provide proper mechanical accessories for filling a new type of container is an error that occurs needlessly. A plant operator decided to merchandise some of his fluid products in paper containers. He had previously been using only glass containers. Paper containers were ordered but all sorts of trouble in filling was experienced because the operator had failed to call upon the manufacturer of the paper containers to supply him with certain filler accessories that were necessary. They were needed so that the paper containers could be properly filled with the same equipment that had been used for filling the glass containers.

140 **Feeding Temperature Too High**—An operator received complaints from his customers that the texture of his products was unsatisfactory. This product was extruded by a special machine and then wrapped in moisture-proof parchment. After this it was placed in separate containers. Investigation showed that the product was fed in through the extruder at too high a temperature, with the result that the product reached the customer with a texture similar to that of lard. Its texture should have been grainy. By taking care to place the product in the extruder at the correct temperature, the cause of all the complaints was eliminated.

141 **Incomplete Specification**—In automatic capping, it is very important that the contour of that portion of the chuck which holds the cap should exactly fit the cap. An automatic capping machine had been in successful operation for a number of years, but suddenly a complaint came from the user that the capping machine was not functioning properly. Investigation disclosed that the cap now being used had been ordered from another cap manufacturer, and that there was a slight difference in the cap contour, so that the cap was not held properly in the chuck.

142 **Needed Greaseproof Liner**—A manufacturer of biscuits and crackers decided that he would increase the moisture-proofness of his package by using asphalt laminated carton stock in place of waxed wrappers, etc. This decision was made in the late spring. About the middle of July, he was receiving returned goods in which the cartons had become badly discolored and darkened. The explanation, of course, is very simple.

The complaints arose from the packages of short biscuits which carried an appreciable amount of fat. This dissolved in the asphalt and gave very severe and unsightly staining of the exterior.

143 **Didn't Know Product Variations**—A dry filling machine equipped with scale, did not weigh accurately. Investigation disclosed that the consistency of the material being filled could not be controlled in the manufacturing process, whereas the sample submitted when the machine was first ordered was a dry and free-flowing powder. At times, under the manufacturing conditions, it was impossible to control the process to prevent it from coming to the packaging operation occasionally in a slightly moist condition.

Had this condition been explained to the filling machine manufacturer when the order was placed, he could have made provision for handling the material in this condition and the trouble would have been avoided.

144 **Filling Too Fast**—The cause of this trouble was speeding up the machinery. In trying to keep up with orders, the operator of the filling machine had increased its speed. The product was a carbonated beverage. The operator was suddenly confronted with an excessive number of bottle bursts on the filling line. Examination showed that the feed clocks, which at lower speeds were performing satisfactorily, were now giving the bottles a sharp impact as they picked them up and rotated them into the machines. The resulting impact caused bruises and weakening of the bottles. Hence the explosions.

Incidentally, this example was one where a local mechanic by his own peculiar hook-up was trying to exceed the highest rate specified by the machine manufacturer.

145 **Failure to Give Printer Time**—Too many firms using packaging material do not allow adequate time for the printer to produce a quality job. For one reason or another, the order is delayed, and further delayed. At last, when it is sent in, the order has to be rushed pell-mell through production. This, of course, does not give the printer a fair chance to assure a good quality job.

146 **Didn't Give the Pump a Chance**—A food packager, closing cans under vacuum, complained because the vacuum in the can was too low. Investigation showed that the vacuum pump used required a 4-in. vacuum line. Fur-

ther investigation showed that a 4-in. pipe was used for approximately the first 10 ft. The remaining 150 ft. between the pump and the vacuum closing machine were 1½-in. pipe. And to make matters worse, six unnecessary elbows were used in this line. The average pipe-fitter's desire for square turns frequently results in unnecessary expense for pipe fittings, as well as decreased efficiency of the pumping operations.

Because pipe-fitters usually have so little experience with vacuum, and because the general concept of a vacuum is "nothing" or "practically nothing," there is a general tendency to cut down on size of vacuum pipe lines. As a matter of fact, a vacuum is decidedly a "something"—a highly attentuated atmosphere with very little differential of pressure to force it along. Without adequate sizes of vacuum lines, the pump hasn't a chance to do the work it is capable of doing, or for which it was designed.

147 **Package Wholly Inadequate** — Sliced citron, orange and lemon peels were packaged in paper cartons with a window that was covered with glassine paper. Without any protection against moisture loss, the peel soon dried out, crystallized, and became absolutely worthless. Upon substituting a good moisture-proof wrap, the trouble disappeared.

148 **Ignorance of Freight Specifications**—A shipper who used corrugated boxes had always specified a "special slotted carton" with the outer flaps cut off by an expensive extra operation in order to bring the inner flaps within six inches of each other. Several years ago this 6-inch gap was required by the railroads, but the shipper was not aware that the requirement no longer holds. At present he is now making a considerable saving on his box purchases by having them cut "regular slotted carton" style, with inner flaps the same length as the outer flaps, and a 7-inch gap between the inner flaps.

It is not recommended, however, that this gap be over 8 inches.

149 **Package Needed Inside Protection**—A fruit cake mix was packaged in what appeared to be a very ingenious package. It consisted of a special die-cut carton into which was fitted a paper envelope of the "mix" flour and a transparent wrapped unit of mixed and preserved fruits. The entire package was then wrapped with waxed paper and also with metal foil, apparently in an attempt to prevent the moisture penetration from the outside. Obviously, the idea was to protect the dried "flour" portion of the mix from moisture absorption from the outside in order to improve its keeping qualities. Inasmuch as the preserved fruit unit inside the package had a high moisture content, the care taken to protect the flour from the outside was labor lost, because an equalization of moisture between the various components inside the package took place. By this is meant that there was a transfer of moisture from the fruit to the flour until a state of equilibrium was reached. The fruit was able to furnish sufficient moisture to the flour to cause the latter to spoil rapidly, due to the ensuing loss of leavening power. In some cases there was a development of mold.

A packaging error of this sort has a somewhat ludicrous character. Barriers had been built against an enemy outside, but the enemy was entirely within.

150 **Perfumed Ink Made Matters Worse**—A printer had been receiving complaints from various food companies that the labels which he was supplying had a bad odor. Being an ingenious printer, as all printers are supposed to be, he decided that rather than make any rational experiments to discover the cause and correct it, he would quickly cure the trouble by the addition of a pleasant aromatic material to the ink.

This was done by adding vanillin. Much to his surprise, however, the complaints rather than diminishing, increased at once, both in number and in severity.

The answer, of course, is that it is not possible to mask ink odors by the simple addition of aromatic materials. The only sure and sound means is to cooperate with the ink-maker who will supply the ink and suggest a technique for the solution of such a problem.

151 **Warm Containers for Frozen Products**—Complaints come in that the texture of a frozen product which was placed into containers in a semi-fluid state, was unsatisfactory. The trouble was found to result from filling the containers when their temperature was sufficiently high to melt some of the product placed therein. This melting occurred between the time of filling and final freezing.

152 **Roundabout Cause of Ink Bleed**—A butter manufacturer bought a new type of wrapping machine which required an unusual cutoff of the vegetable parchment wrapper from the roll feed. Due to the fact that this cutoff was not standard, the paper manufacturer had to resort to a special printing job.

This, in turn, required his use of a special machine on his part, which in turn, required a special type of ink.

Unfortunately for the butter maker, the special and unauthorized ink was discovered after several weeks to be leaving the wrapper and discoloring the butter, giving it a very sickly green hue. Blue ink was, of course, used in printing the wrapper.

This mistake cost the paper maker about $5,000, and resulted in a cost to the food manufacturer, due to loss of trade, of an amount not to be computed with accuracy.

153 **Needed Sterilized Liners** — Complaints from customers, to the effect that products dispensed in their packages were moldy, began to be received by a food manufacturer. The product was distributed in wooden containers, lined with vegetable parchment. Upon studying the packaging methods, it was discovered that the vegetable parchment liners were not sterilized. The trouble with molding disappeared when the liners were properly sterilized before being used.

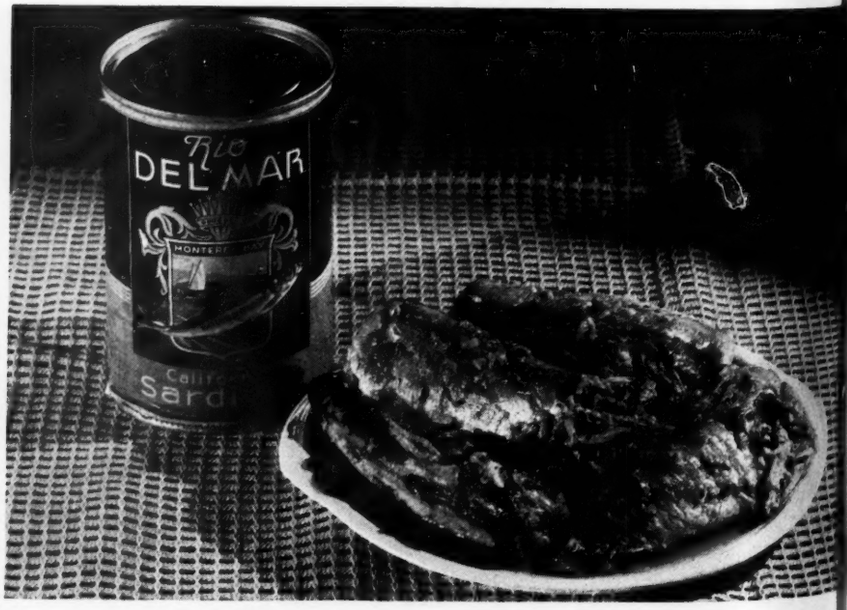
154 **Too Light Weight Material**—False economy is represented by cheapening the bag by the use of a lighter weight of transparent cellulose than should be used. The result is increase in breakage in use, loss of good display through failure of the package to hold its shape, etc. These factors really offset the economy supposedly needed in the change of the material in the package.

(To be continued)

New Packages & Products

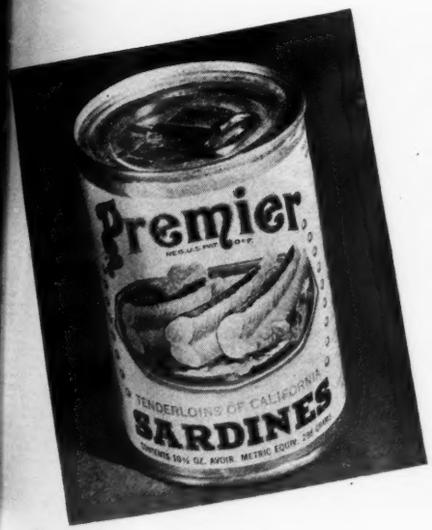
New Labels for Old Lines

THE CROSSE & BLACKWELL CO., Baltimore, Md., manufacturers of a varied line of food products, has recently placed new labels on its extensive line of canned soups. The old labels, red on a white background, or white on a red background, are replaced by labels with a blue-black upper portion and a cream color lower portion. The use of color bands and a red soup tureen on all varieties give the packages a family resemblance. The new labels follow the trend toward the modernization of labels. They have more appealing color combinations than the old, and greater visibility. Because of the greater display value of the new labels, they are better adapted to the self-service store than the old label.



Soup in Paper Cartons

A NEW SOUP has recently come on the market packaged in a paper carton. Mrs. Grass' Home-Style Noodle Soup is the product of I. J. Grass Noodle Co., Chicago, Ill. Packed in the carton is a glassine envelope containing dried vegetables and seasoning. The envelope contains sufficient soup concentrate and dehydrated vegetables for six full bowls of noodle soup. Finely shredded noodles sufficient for six bowls of soup are also packaged in the carton.



From Flats to Rounds

THE TRADITIONAL FLAT CAN in which sardines have been packaged for many years faces a new competition and may have to struggle to maintain monopoly in the industry. Several brands of California sardines are now coming to the market in standard No. 1 picnic round cans. "Premier" brand of sardines, packed in a key-opened can to the top of which the key is attached by transparent cellulose tape, is distributed by Francis Leggett & Co., New York. "Rio Del Mar" sardines are the product of Del Mar Canning Co., Monterey, Calif.

Re-Use Container Suggests Products

"SIGNET" brand cocktail cherries product of United States Products Corp., Ltd., San Jose, Calif., are packaged in "old-fashioned" 5 oz. cocktail glasses capped with pry-up tin lids. The re-use of the glass for an old-fashioned cocktail suggests cherries, the original product in the container. In many cases, there is no association between the product and the re-use container. In but a few cases, the association is remote. There is, however, a direct association of cocktail cherries and "old-fashioned" glasses.

Food DISTRIBUTION

Testing Guarantees Acceptance

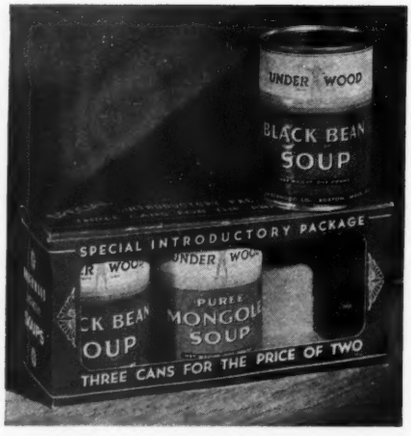
SUPPORTED by an advertising campaign, a new product "Flakorn Corn Muffin Mix" product of Flako Products Corp., New Brunswick, N. J., was introduced on the New York market the end of 1938. The product has since been placed in distribution in the eastern and southeastern states. The successful introduction of this product through retail outlets was the result of a two-year period of tests. The original product some two years ago was distributed in plain glassine bags, sealed with a sticker printed directions for use. In this type of container the product was introduced through church and fraternal organizations. The product was later packaged in a glassine bag within a folding carton and introduced on a test basis in a single city. The results from this succession of tests provided the merchandising facts for a successful introduciton of the product through retail outlets.

"Vitamized" and "Mineralized"

THERE has been a growing tendency among food manufacturers to stress in their merchandising and advertising the importance of the mineral and vitamin content of their products as an aid to health. The content of many foods has recently been enriched by the addition of minerals and vitamins to food products which did not contain them or by enriching the original content. The Cream of Wheat Corporation, Minneapolis, has recently introduced a "new five-minute" Cream of Wheat with added iron, calcium and phosphorus and Vitamin B-1. There has been little change in the Cream of Wheat product or its package for more than 40 years until recently. The new product can be cooked in a third of the time required to cook the old product. The new package emphasizes the high nutritional value of the product. The new Cream of Wheat is being introduced in mixed cases, half of the old product, half of the new, in order not to destroy the present market before acceptance has been gained for the new product.

Plum Pudding Mix Includes Premium Bowl and Pudding Bag

NEW YORK chain store Gristede's pre-cooked plum pudding includes a premium bowl covered by a white cloth pudding bag held in place by a cord around the rim of the bowl. A tag fastened by a red ribbon around the top of the bag, explains that the bowl and its contents should be steamed in boiling water for one hour before serving. The cloth over the top of the bowl serves as pudding bag. An old-fashioned steamed plum pudding results.



Food DISTRIBUTION

Nine Million Prospects

BABY FOOD MANUFACTURERS are developing a new selective market for specially prepared foods. These junior "chopped foods" are prepared for the graduating class which has thrived on strained baby foods. The market is sizable. Over nine million grown-up babies are in this market—more than one million graduate from babies to juniors (years 1-5) each year, (FOOD INDUSTRIES, Feb. 1939, p. 83). Beechnut Packing Co., Canajoharie, N. Y., packers of Beechnut strained baby foods, has recently placed on the market, "chopped foods," vegetables and soup for junior feeding.

Own Products as Premiums

LAST YEAR, William Underwood Co., Boston, Mass., introduced a number of new products by allowing the known to introduce the unknown. The new products with the words, "Sample, Not for Sale," stamped on the label were packaged in a combination package with a popular member of the family, (FOOD INDUSTRIES, Dec. 1937, p. 712). Both products sold for the price of the known item. This year, Underwood canned soups are introduced in new markets by means of three cans packaged in a folding carton with a cut-out window which bears the announcement, "Three cans for the price of two."

Hints and Hurdles

Steal March on Parade of Progress

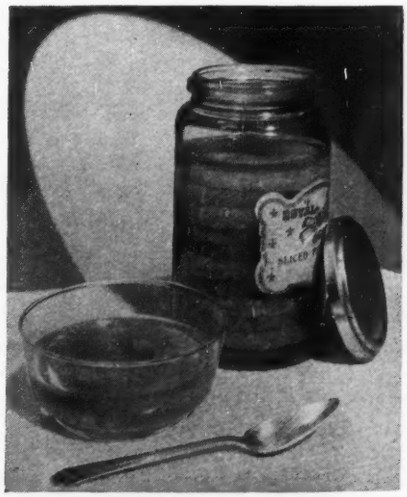
LOCAL JOBBERS throughout the country are stealing a ride on the Parade of Progress bandwagon of national advertisers. They are packaging such items as dried fruit, peas, coconut, macaroni, noodles and candy in bags emblazoned with the Parade of Progress label. The design and lettering on the bags ties up the products with national brands in the minds of consumers. One bag shown here is covered with such names as Del Monte, Jello, Oh Henry and Bond Bread. The label on one package suggests the wisdom of purchasing nationally advertised grocery items, evidently an effort to disarm criticism of this essay into hitch hiking. Sometimes the name of the jobber does not even appear on these containers.

Camera to Judge

A NEW METHOD of evaluating package design may eliminate part of the human equation and aid in producing packages with greater merchandising value. This is the "photometric analysis" method. Photographs of the package, against variable backgrounds, are taken at variable distances, in focus and out of focus, with and without color filters. Analysis of the photographs reveals much which the eye cannot predict. This method may take some of the guess out of package design, and largely replace consumer and retail store testing methods. The sales history of those package designs checked by this method will be followed with interest.

Grade Label Race Is On

THE MODEL food and drug law which is offered as a pattern on which states may formulate state food and drug laws suggests provisions for compulsory grade labeling. This reflects the government's attitude. This release came at about the same time as a release from American Management Association, sponsoring organization of the competition for the I. D. Wolf Awards, which announced in recognition of the increased importance of informative labeling, a new classification for competitions bringing the total to 21. The new classification provides an award for "the package most effectively displaying specific buying information about the merchandise of greatest help to the consumer at the point of sale."



Modern production methods, advertising and improved distribution have greatly lowered the cost to the consumer.

Production Up — Price Down

THOSE WHO HAVE A QUARREL with advertising and modern production methods might well follow the history of the development of the pineapple industry. Pineapple was not always a shelf item in every grocery store, as it is today. According to the Department of Commerce, the pack of pineapple for the year 1910 was 465,000 cases. Hawaii was then the only important producer of pineapple in packaged form, supplying this market. By 1937, the total pack of pineapple has risen to more than 16,000,000 cases.

Recently, a jar of pineapple, packed in glass in 1912 (possibly a part of the 1910 pack) for R. C. Williams & Co., New York wholesale grocers, was found among stock that had been stored and forgotten in a basement corner of an old retail establishment. Upon examination, the fruit in the jar was found to be in a surprisingly good state of preservation. The jar had retained a 12-in. vacuum throughout the 26-year period. On a label of the jar was the price mark $1—a price not greatly out of line with the cost of the product at that time. Modern production methods, advertising and improved distribution methods have increased the canned pineapple production approximately 35-fold since 1910 and, correspondingly, have reduced the price to within reach of the average consumer.

Food DISTRIBUTION

Truck Protects Food Flavors on Long Hauls

Also equipped for economical, safe and comfortable operation over mountainous 1,000-mile route

This truck makes a weekly, 1,100-mile trip, starting from Portland, Ore., and covering the southeastern part of the state, including the Cascade and Blue mountain ranges. It delivers coffee, tea, spices and extracts to hotels and restaurants in that area. It is a 1938 Diamond-T 1½-ton unit owned by Boyd Tea Co.

CARRYING coffee, tea, spices and extracts, the Boyd Tea Co. truck shown on these pages covers a weekly route of 1,100 miles through the southeastern part of Oregon. Its work is most unusual because of the length of the route and the time it takes to cover it.

Peddler truck routes selling various food products have become quite popular in recent years in the East. There the density of population around the large cities has provided sufficient outlets to make a two-day route economical. But a route which takes a week to cover is most unique and sets up many special operating problems.

This is particularly the case in the Boyd truck, with its mixed load of coffee, tea and spices. If the odor of any one of these products permeates the other products, the latter become unsalable.

This situation is not so serious when the various items are placed in the truck in the morning and all delivered on the same day. But when some of the products remain in the truck for a week, definite precautions must be taken against possible transfer of odors.

You can imagine what would happen to a pound of coffee or tea if either absorbed the odors of a bottle of vanilla extract broken in handling or in shifting of the truck load on rough roads. To guard against such contingencies, the Boyd truck body is divided into two airtight compartments. One of these compartments is subdivided into bins for carrying coffee in 1-lb. bags, five of which are enclosed in a large paper bag to make a 5-lb. unit.

The truck shown here is one of a fleet of similar units owned by the Boyd company, whose main office is in Portland, Ore. The fleet primarily serves restaurants and hotels in Portland and throughout Oregon. Coffee is the principal item carried, teas, spices and extracts being secondary. The average weekly mileage of the Boyd trucks is 700. But the truck shown here covers one of the company's longest routes and travels 1,100 miles per week. Operating out of Portland, the truck travels over rough and often treacherous roads in the Cascade and Blue mountains.

The truck is a 1½-ton Diamond-T. To provide every comfort for the driver on his long weekly treks, the vehicle is fitted with a deluxe type of individual cab with the most comfortable seat cushions and latest accessories. The accessories include a heater for winter operation, a fan for summer, a radio to "reduce" the

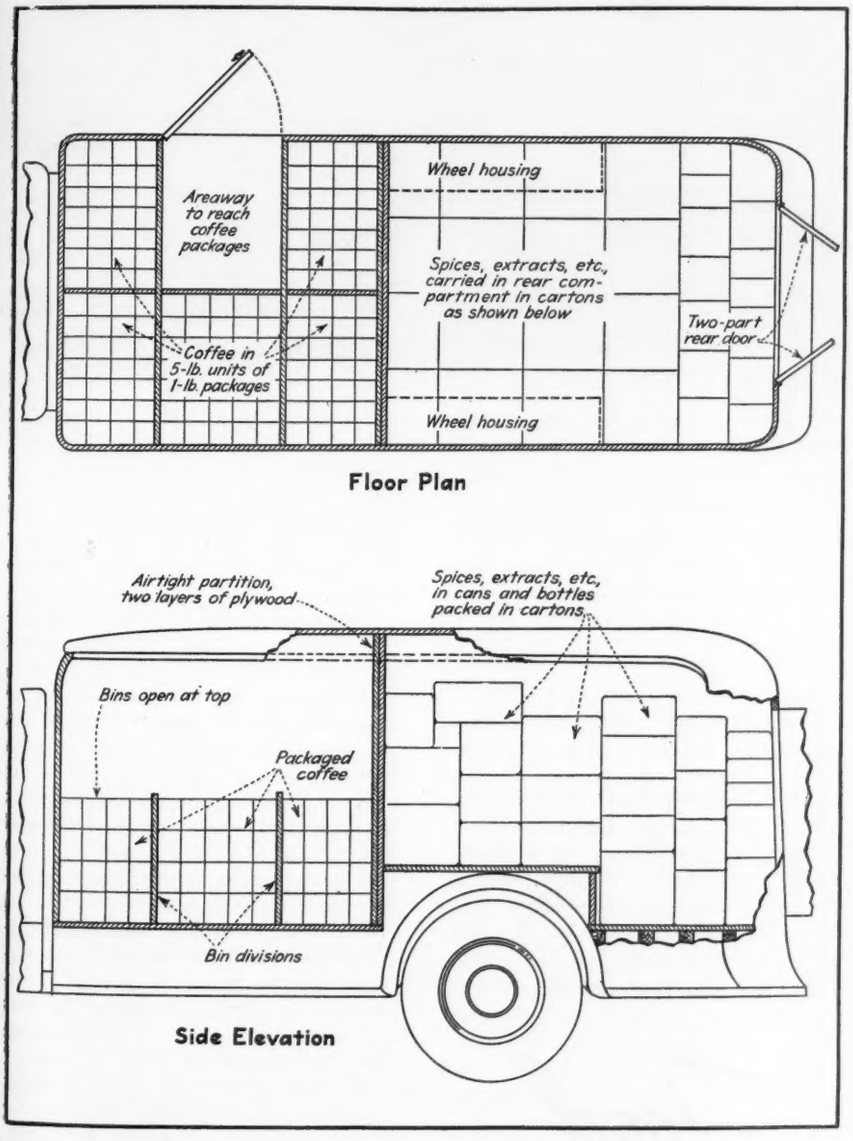
Food DISTRIBUTION

time between stops and an electric dash clock. The cab is also fitted with double windshield wipers and a windshield defroster to assure adequate vision in wet or freezing weather.

In the interest of smooth operation, the truck is equipped with automatic, thermostatically controlled radiator shutters and also a condenser for the alcohol used as antifreeze. The condensers collects the alcohol which would otherwise be lost when it boils off on extremely warm winter days or on the long, up-grade pulls over some of the mountain ranges.

Because of the long run, the truck is also fitted with an auxiliary gasoline tank. This permits the company to take advantage of the lower gasoline price at its home tank as compared with prices at the highway stations. Total gasoline capacity is 60 gal.

The standard gasoline tank, with a capacity of 30 gal., is retained under the driver's seat. The auxiliary tank, which also holds 30 gal. is located under the truck body floor. It is situated on the right side of the frame between the rear wheel housing and the front end of the body. The filler pipe on the auxiliary tank terminates in a shallow, rectangular recess in the right side of the body. Since the pipe and its filler cap do not extend out beyond the body side, they cannot be knocked off in narrow parking spaces.


Areaway to reach coffee packages
Wheel housing
Spices, extracts, etc., carried in rear compartment in cartons as shown below
Two-part rear door
Coffee in 5-lb. units of 1-lb. packages
Wheel housing
Floor Plan
Airtight partition, two layers of plywood
Spices, extracts, etc, in cans and bottles packed in cartons
Bins open at top
Packaged coffee
Bin divisions
Side Elevation

Sectional side and top plans of the unusual truck body used by the Boyd company for delivering coffee, tea, spices and extracts. A crosswise airtight partition divides the body into two separate compartments. Bins are provided for carrying coffee in paper bags.

Another feature of the Boyd truck is extension of the exhaust pipe to the extreme rear end of the body. There the end of the pipe is bent downward so that the exhaust gases are directed toward the ground. The purpose is to prevent the collection underneath the body of exhaust gases which might seep into the body and contaminate the products.

In operation, the truck leaves its Portland base with a full load of the various items distributed on the route, the weight of the load varying from 6,000 to 7,000 lb. Arriving at the first stop, the driver checks the customer's stock and leaves a sufficient quantity of the various items to last the customer until the next call. After carrying the goods inside, the driver makes out the sales slip and collects the cash, or he gets the customer's signature if the account is handled on credit. In this manner the entire transaction of selling, delivering, packing and collecting is done in one operation.

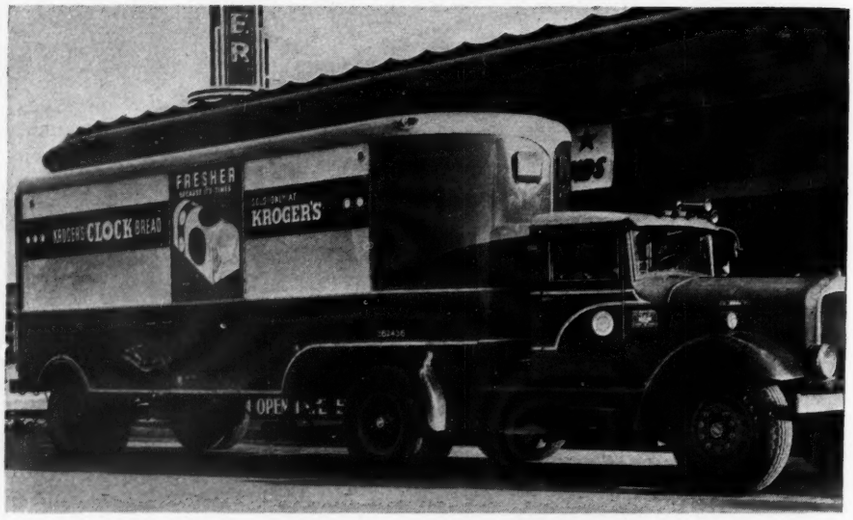
The service rendered the customer is quick, direct and dependable. Prices are in line with the base prices plus delivery charges by rail, parcel post or express, considering the quicker and more direct truck service rendered. It is this combination of service and price which makes the extremely long route both desirable to the customer and profitable to the company.

In loading the truck, coffee is placed in the front compartment and spices, extracts and so forth in the rear compartment. The two compartments are separated by an airtight transverse partition made of two layers of plywood. All the edges of the dividing partition at the floor, sides and roof are mortised and dovetailed to make the joints odorproof. There is no connection between compartments. The front one is reached from a door on the right, or curb side of the body, while access to the rear one is through a two-part door at the rear of the body.

Spices, extracts and other products in cans and bottles are packed in corrugated paper cartons which are stacked on the floor in the rear compartment. The 5-lb. units of coffee in separate 1-lb. bags are packed snugly into a series of five bins in the front compartment. The bin divisions extend about half way up the body side, and the bins themselves are open at the top. They are reached by the driver-salesman from an areaway in the body directly in line with the side door, as shown in the drawing. The bins hold a total of 3,000 lb. of coffee.

These Companies Capitalize On the Public Relations Value of Trucks

MOTOR vehicles affect the public relations of the companies which operate them. But their effect may be either constructive or detrimental. In the following letters from executives in the food field, pointers are given on how to employ trucks for the betterment of public relations.



Big trucks can easily be detrimental to good public relations. But as designed, maintained and operated by Kroger, the effect is constructive.

Paint Design Important

WE FIRMLY BELIEVE that the color layouts and lettering used in the paint design of body and chassis are the most important factors in the public relations value of motor vehicles.

We also advocate color combinations which minimize the appearance of size of vehicles.

A clean unit on the road has a great effect in bringing your advertising to the fore. The same might be said for a unit with the body, fenders and paint in A-1 condition.

We believe that it is to any company's advantage to have their drivers in uniform. These uniforms should be cleaned weekly and should not carry any cheap form of advertising.

The courtesy on the part of the drivers toward motorists and pedestrians pays untold dividends. This has been proven in our case many times.—GEORGE GREANEY, *Shipping Department, Diamond Ginger Ale, Inc., Waterbury, Conn.*

Clean, Attractive Equipment

EVER SINCE the Kroger Grocery & Baking Co. took over operation of its own transportation system, considerable care and thought has been devoted to making our equipment attractive and keeping it clean.

Obviously, there are both advertising and public relations elements involved. Color layout and lettering in the paint design of bodies and chassis have been worked out by our advertising department with the help of the art department.

While some advertising is used on truck and trailer bodies, care is taken to see that it is not of blatant type and that it harmonizes with the general color scheme of the vehicle itself.

Keeping the body and chassis of our equipment clean is a routine matter under way continually in all of our garages. We feel quite definitely that the housewife likes to associate cleanliness with her food, and would resent having foodstuff hauled in dirty, dilapidated vehicles.

Much the same holds on the question of repairing body and fenders and keeping the paint in good condition. Equipment is painted on a schedule which requires some of this work to go on almost constantly.

Kroger is establishing an enviable reputation for highway safety, having won the national championship a year ago. Naturally, condition of our equipment has a good deal to do with maintaining a good safety record. Accidents of any sort are certainly not desirable from a public relations standpoint.

We feel that our drivers are unusually courteous to pedestrians and motorists. One rigid enforced rule is that Kroger drivers stay on the right-hand side of the road at all times, not just when someone wants to pass them.

There have been numerous examples of Kroger drivers aiding distressed motorists, helping to put out fires, and supplying them with equipment or assistance in making repairs.

There have been a number of instances in which our drivers have discovered farm fires and warned occupants. Of course, examples of this sort have resulted in very favorable press notices and editorial comment.

Because virtually all of our hauling is done at night, unusual opportunitiy to aid distressed motorists not infrequently presents itself.—DAVID H. CROOKS, *Public Relations Department, Kroger Grocery & Baking Co., Cincinnati, Ohio.*

Food DISTRIBUTION

Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD TECHNOLOGY

Inside Information On Baking Temperatures

No PREVIOUS STUDY of interior temperatures in doughs or batters during baking has brought together the figures for a variety of baked products. A study has therefore been made of baking powder biscuit, bread and cake (results agree with those of previous investigators) and of pancakes, waffles and muffins (not hitherto reported). From the observed temperature behavior, inferences are drawn concerning doughnuts, wafers, crackers and dog biscuit. In addition to the interior temperature measurements, the crust temperatures were measured for biscuit, bread and cake.

Thermostatically controlled gas and electric ovens were used for baking tests. Temperature readings were taken from chromel-alumel thermocouples, embedded in the dough or suspended in position in the batter. Pancake and muffin batters called for slight modifications in the method. Readings from thermocouples which migrated from the approximate center of the baked product were discarded.

Conventional home or bakery recipes were used in making up the doughs and batters for testing. Baking powder biscuit dough, for example, was composed of soft wheat flour, baking powder, shortening, salt and milk. Thermocouples were inserted into the cut dough from the sides. In the case of biscuit, the baking time (oven temperature 232 deg. C.) was extended in order to gain aditional information about dough behavior. The center temperature reached 99 deg. C. within 10 minutes, rose to 100 deg. C. at 15 minutes, and to 101 deg. C. between 23 and 25 minutes. Shrinking was apparent after 20 minutes. Caramelization, though progressively decreasing, extended all the way to the center. This does not occur in the normal 12- to 14-minute baking, but similar caramelization, with extensive dehydration, is a feature in baking prepared dog-food biscuit. It indicates temperatures well above 100 deg. C., more nearly like crust temperatures.

In nearly all other doughs, the temperature attained during baking is about that of boiling water. The rate at which this temperature is reached depends on loaf size (perhaps also on composition), oven temperature and the character and shape of the pan. In baked products with soft, spongy crumb, the interior temperatures do not rise above 100 deg. C. because only enough water is evaporated for retention of cell structure in the cooled product. This applies to baking powder biscuit, bread, cake and muffins. By inference it is also true of doughnuts. In crisp, brittle, short-baked products the interior temperature must rise above 100 deg. C. Dehydration of dough colloids must proceed to an extent which will give the required properties in the final product.

Crust temperatures rise rapidly to about 100 deg. C. Later another rise accompanies the dehydration of dough colloids. The rate of this rise depends on the size of the test piece. When caramelization sets in, dehydration is slowed down so that in a properly browned crust the temperature does not rise above 150 deg. C.

Digest from "Temperatures Attained in Baking Products," by R. A. Barackman and R. N. Bell, *Cereal Chemistry* 15, 841, 1938.

Calculating Convection Heating Rate for Cans

WHEN CANNED FOODS are sterilized in a retort, the contents heat up by conduction, by convection, or both. Thick materials like creamed corn, pumpkin and dog food heat chiefly by conduction, hence rather slowly. Thin products, such as broths, brine-packed peas, and beer, heat much more rapidly, since the heat causes convection currents in the thin liquid.

In cases of *convection heating,* if the rate of heat penetration into one size can is known by experience, it is possible to calculate the rate for another size of can. For every size of can there is a can factor, height times the radius divided by the sum of height and radius. The rate of heat penetration into a can of size A is to the rate into a can of size B as can factor A is to can Factor B. Experiment shows that this works in practice.

Digest from "Thermal Processing of Canned Foods in Tinned Containers. I. Variation of Heating Rate with Can Size for Products Heating by Convection," by O. T. Schultz and F. C. W. Olson, *Food Research,* 3, 647, 1938.

Horse-radish Vapors Prevent Bacterial Growth

THE VAPORS given off by ground horse-radish root exert a strong effect in preventing the growth of bacteria. Garlic and onion vapors have a similar but weaker effect, although their action lasts longer. This property is most effective at 37.5 deg. C. and decreases as the temperature drops. Horse-radish is not equally powerful in its action on all bacteria, as for example *Escherichia coli* is more resistant than *Bacillus subtilis.*

Digest from "Inhibitory Properties of Horse-Radish Vapors," by Milton J. Foter and Ann M. Golick, *Food Research,* 3, 609, 1938.

How To Get Lead Out of Maple Sirup

SIGNIFICANT AMOUNTS of lead were found in 80 out of 500 samples of New York State maple sirup. This comes from the lead paint used on wooden sap buckets or to cover rusty spots on tin buckets, or from buckets and other equipment tinned with terne, a lead-tin alloy, or from solder joints in the equipment. The lead content can best be reduced on the farm by adding skim milk to the sirup and boiling for five minutes, then skimming and filtering off the curd. Five per cent milk will cut the lead by one-half, 10 per cent by three-quarters and 15 per cent by seven-eighths. Dried skim milk is not as effective, for it reduces the lead content by only about one-half.

Digest from "Sources of Lead in Maple Syrup and a Method for its Removal," by C. O. Willits and C. J. Tressler, Jr., *Food Research,* 3, 449, 1938.

(*Turn to page 295*)

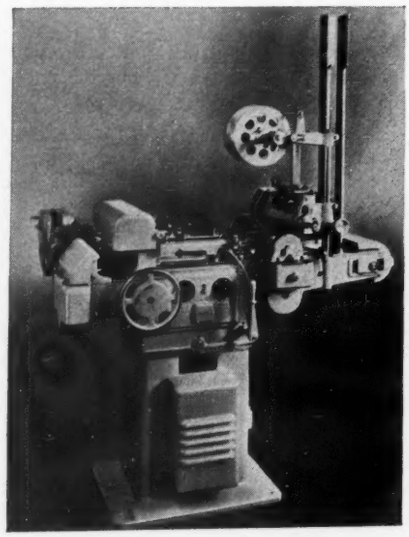
Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

High-Speed Wrapper

PACKAGE MACHINERY CO., Springfield, Mass., has developed the Model CM-2 wrapping machine, a high speed machine for wrapping small packages. Its range is from minimum package dimensions of 1½ in. long by ⅝ in. wide by ⅜ in. thick to a maximum of 5¼ in. long by 3½ in. wide by 1¼ in. thick. Speeds are 250 per minute or more. Power is derived from a ½ hp. gear reduction motor.

This wrapping machine uses plain or heat-sealing transparent cellulose, or glassine, in roll form. It is designed to wrap the usual type of closed package and also open trays or boats containing loose articles. Floor area is 4 ft. 3½ in. x 3 ft. 6 in.



High speed wrapping machine for small packages

pH Determination Set

W. A. TAYLER & CO., INC., 872 Linden Ave., Baltimore, Md., has redesigned its "Slide Comparator" for use in the determination of pH, chlorine and phosphate. With the new device, determinations are made simply by sliding the color standards in front of the test sample until a color match is obtained. The comparator is small and easily portable. The color standards are enclosed in a Bakelite case so that there are no loose standards to be inserted and removed when making pH determinations. This avoids loss or breakage from handling of individual standards.

Proportional Sampler

FOR OBTAINING proper composite samples of milk or similar products, Braun-Knecht-Heimann Co., San Francisco, Cal., is distributing the Dahlstrom Proportional Sampler. This device was developed by Allen Dahlstrom, Lucerne Cream & Butter Co., Oakland, Cal. It is constructed of stainless steel, weighing only 1.75 lb., and is designed for self-rinsing and self-emptying. When the milk or cream is properly stirred or agitated immediately before sampling, it is claimed that the sampler will take true proportional samples by simply turning the scale on the dial to the number of pounds of milk or cream in the delivery. An advantage claimed is the assurance of uniformity in samples, regardless of who does the sampling, the human factor being eliminated.

Packaging Scale

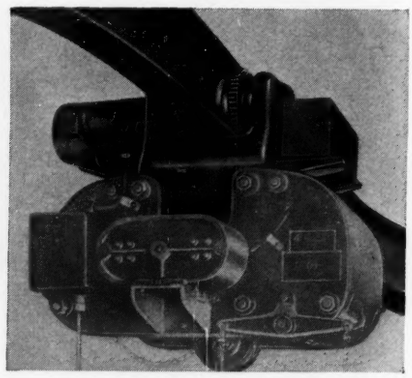
JACOBS BROS. CO., INC., Detecto-Gram Division, Main and Water Streets, Brooklyn, N. Y., has developed a package scale of 60 lb. capacity having the over and under feature used on smaller models. Also the tower of this scale is adjustable to face in four directions, so that it can be fitted into existing production lines. This scale is available in a floor model 50 in. high, or a bench model 34 in. high. Either scale can be equipped with various plates or scoops, to fit the product that is to be weighed.

Explosion-Proof Electric Motors

LOUIS ALLIS CO., Milwaukee, Wis., has introduced a new line of alternating and direct current, explosion-proof motors, for which are claimed eighteen separate mechanical and electrical improvements.

Motor Trolley

AMERICAN ENGINEERING CO., Philadelphia, Pa., has developed Type "RB" motor trolley, for use with "Lo-Hed" hoists in capacities from 1 to 3 tons. This trolley is a separate unit, sold either with a Class "B Lo-Hed" hoist, or separately for converting such a hoist, already owned, to a motor-driven trolley type hoist. The standard control is from the floor by cords. Special controls to suit special conditions are available.



Motor trolley for "Lo-Hed" hoists

Factory Fire Protection Unit

AS AN AUXILIARY FIRE PROTECTION for factories and warehouses, Clark Tructractor Co., Battle Creek, Mich., have developed a unit consisting of a special duty fire pump installed on a Clarktor-6 industrial tractor. The pump is of the centrifugal type and meets test requirements of the National Board of Fire Underwriters. The pump is designed to handle any kind of water regardless of the dirt which it may contain and therefore can draw its supply from a pond, creek or reservoir, as well as from a hydrant. This unit will deliver 400 gal. of water per minute at 120 lb. pressure. The pump is driven by floating flexible drive from the tractor motor and is equipped with an automatic primer.

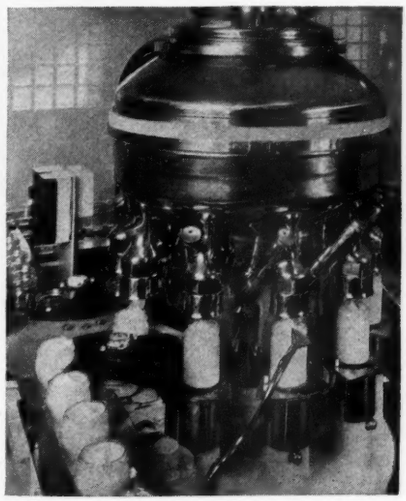
As an additional service, the tractor on which this pump is mounted can be used for regular push-and-pulling service in industrial plant, yard or

building. The pump can also be used for pumping water for flushing and washing purposes, or for filling or draining tanks.

All-Purpose Filler

FOR FILLING all sorts of products into glass and metal containers, Mojonnier Bros. Co., 4601 W. Ohio St., Chicago, Ill., have introduced a vacuum "All-Purpose Filler." This filler is designed to give uniform, accurate filling to a predetermined level and to reject broken containers, because of its vacuum principle of operation.

Capacity of the filler accommodates any size or shape of container up to 1 qt. Four sizes are available, with speeds from 40 to 150 containers per minute. Construction is of stainless steel.



All purpose filler for glass and metal containers

Magnetic Separator

STEARNS MAGNETIC MFG. CO., Milwaukee, Wis., has introduced a new magnet separator designed to remove reluctant, minute magnetic particles from finely powdered materials. This is called Type V. In operation, it spreads the material that is to be purified uniformly over the face of the magnet in the form of a fine rain. The impurities contacting the pre-magnetized pole of the magnetic field are removed by this secondary or deflecting field. This allows the purified material to continue on through the machine to final delivery. This separator is designed in various sizes according to the nature of reluctance of the magnetic material that is to be removed.

Smoking Unit

CARRIER CORP., Syracuse, N. Y., has developed an air-conditioned smoking unit for the smoke-curing of hams, sausages, bacon and other meats. This "all-in-one" smokehouse includes all the functions of air conditioning—temperature and humidity control, and air circulation. The smoke is filtered before it enters the smoking chamber, so that the possibility of "green spots" caused by sticking soot is avoided.

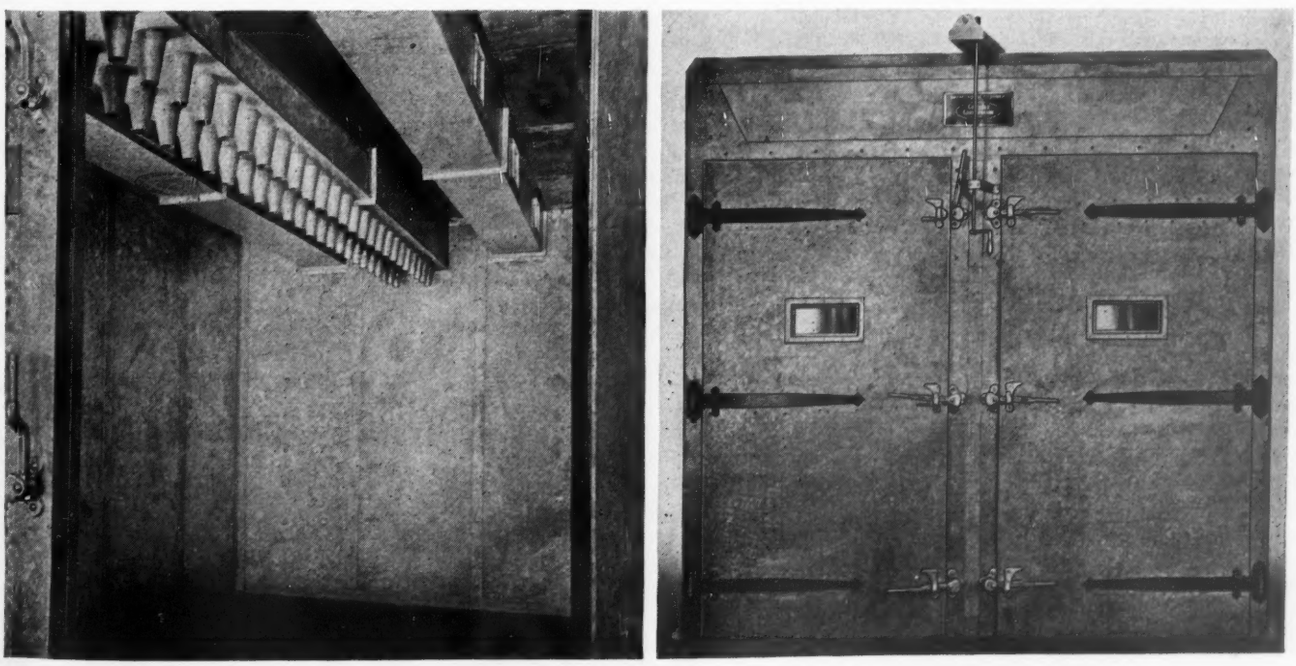
This unit comes equipped with a smoke generator, a heat diffuser which controls heat and air circulation, humidity control equipment and automatic controls. The unit is compact, occupying relatively little space in proportion to output.

Telescopic Stacker

LEWIS-SHEPARD SALES CORP., 245 Walnut St., Watertown, Mass., is making a telescopic stacker equipped with a retractable revolving base, called Type PBRT-1923. The base construction of this stacker includes retractable travel wheels mounted in stationary position in the base. The elevator may be moved along the floor with its regular travel wheels to any given position. These wheels can then be retracted, allowing weight of stacker to be transferred to base plate, upon which the stacker can be rotated to any position. The stacker can thus be turned at right angles within its own length. Capacity is 1,500 lb. and maximum lift is 133 in. Collapsed height of 8 ft. 2½ in. permits passage under low trusses.

Water Softener

INTERNATIONAL FILTER CO., 59 East Van Buren St., Chicago, Ill., has developed a new water softener, called the "Accelator." This is said to have advantages in complete and rapid softening of water at low cost, and to have low space requirements. It is a chemical softener, operating without sedimentation.



Automatically controlled, air conditioning smoking unit; exterior view, right; interior, left

Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

AIR-CONDITIONING EQUIPMENT—A 16-page illustrated catalog on air-conditioning equipment for use in a single room or an entire building has been issued by Carrier Corp., Syracuse, N. Y., showing applications and types.

AGITATOR—The Patterson Foundry & Machine Co., East Liverpool, Ohio, has issued a bulletin announcing "Unipower" agitator built in sizes from ½ hp. to 100 hp.

CUTTERS—"Abbé" rotary cutters for use in cutting food products to desired mesh are the subject of Bulletin No. 45, published by Abbé Engineering Co., 50 Church St., New York, N. Y.

MATERIALS HANDLING EQUIPMENT—Catalog "C," published by American Monorail, 13107 Athens Ave., Cleveland, Ohio, describes and illustrates materials handling equipment for industrial transportation.

MATERIALS HANDLING EQUIPMENT—Redler conveyors and elevators for use in flour mills and grain elevators, and the Tellevel device for automatic control of the level of material in bins and hoppers are completely described with specifications, charts and illustrations in Catalog No. 4238 and Bulletin No. 238, respectively, by Stephens-Adamson Mfg. Co., Aurora, Ill.

MEAT PACKING EQUIPMENT—"Boss" grinders, cutters, stuffers, dispensers, plates and knives, and cookers driven by Troy-Engberg steam engines for meat packing plant installations are described in recent folders by The Cincinnati Butchers' Supply Corp., 2145 Central Parkway, Cincinnati, Ohio.

REFRIGERATING UNITS—Data and specifications of low pressure refrigerating units, Models F-25 and F-33, are given in Bulletin No. 212-D, published by Frick Co., Waynesboro, Pa.

SIFTERS—The "Gyro-Whip" sifter, designed for bolting flour and other ground products, is described in a recent folder by The Richmond Mfg. Co., Lockport, N. Y.

Plant Accessories and Supplies

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued a series of pamphlets describing and illustrating new electrical equipment including: Bulletin GEA-19H, magnetic motor-starting switch CR7006-D7; Bulletin GEA-743B, dealing with three types of reversing drum switches, CR3202; Bulletin GEA—2234B, introducing the CR-1061 hand-operated starting switch; Bulletin GEA-2292A, announcing d.c. magnetic crane control equipments; Bulletin GEA-2679A, featuring photo-electric relay for automatic light control; Bulletin GEA-2907, presenting limit switch CR9440-B1B using Alnico magnet for snap-action; Bulletin GEA-2908, on the oilproof push button and selector switch; Bulletin GEA-2026A, containing information on the brake-motor; and Bulletin GEA-1724A, explaining the construction and operation of controllers for synchronous motors.

LEATHER PACKINGS — "Leather Packings for Every Industrial Purpose" is the title of a 32-page illustrated booklet issued by Alexander Bros., 406 North Third St., Philadelphia, Pa., containing price lists, sizes, specifications and application data.

STEAM METERS—Accurate measurement of steam in the form of condensate is the subject of a revised 12-page Bulletin No. 35-80A, dealing with the rotary condensation meter manufactured by American District Steam Co., North Tonawanda, N. Y.

MAGNETIC EQUIPMENT—High duty, single disk magnetic clutches; the multiple disk magnetic clutch style "ED" designed to operate two clutches in either direction simultaneously; and the vibro-magnetic-analyser for determining magnetic values are discussed in Bulletins 225, 135 and in two mimeographed releases, issued by Stearns Magnetic Mfg. Co., Milwaukee, Wis.

WELDER CONTROL EQUIPMENT—The "Shield Arc" welder with self-indicating dual continuous control is featured with illustrations, types and speeds in a recent 20-page bulletin, No. 412-A, issued by The Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.

Laboratory Equipment

LABORATORY EQUIPMENT—Recent publications of Pfaltz & Bauer, Inc., Empire State Bldg., New York, N. Y., include: "Equipment for Fluorescence Microscopy"; checking list on scientific instruments and laboratory apparatus; "Photo-Electric Cells and Apparatus" for production control; and "De Haën's Fixanal Preparations for Standard Solutions," analytical chemicals available for sugar factories, oil and fat research laboratories, wine tests and milk tests.

pH TESTER—pH papers, for the determination of pH value in acid and alkaline solutions in laboratory and industrial operations, are announced by Paul Frank, 456 Fourth Ave., New York, N. Y.

RESEARCH—"High Bacterial Counts in Milk—Causes and Remedies" by J. Brueckner has been issued by The Diversey Corp., 53 W. Jackson Blvd., Chicago, Ill., in pamphlet form.

Distribution

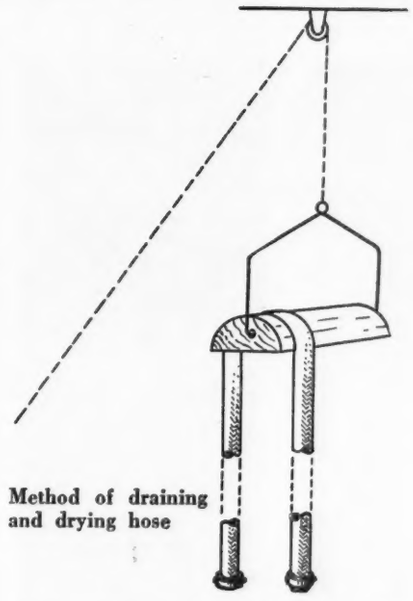
WAREHOUSING — The California Warehouse, 1248 Wholesale St., Los Angeles, Calif., has published a folder describing its services including storage, distribution, and transportation of merchandise.

The Plant Notebook

Method for Draining Hose

Perhaps the most important factor influencing the service life of hose is the degree of care taken to drain it thoroughly after use and dry it before replacing on reels, racks, or in hose houses. This means that the hose must be hung up in such a way that all residual water will drain off by gravity and for a sufficient length of time to insure the evaporation of moisture from interior surfaces and outside fabric. The usual method of doing this is to suspend the section of hose from a sufficiently high point by means of a rope looped around one of the coupling halves, a procedure that is tedious and very unsatisfactory in that it strains the junction between hose and coupling.

A much simpler effective method is that used in a large plant having a great number of hose sections incorporated in its fire protection system. This scheme, shown in the drawing, although primarily devised to facilitate the drying of several hose sections following scheduled testing, has a number of features applicable to any plant. Principal among these are the reduction of elevation required for suspension, no strain on the coupling junction, and the distribution of section weight over a relatively large hanger area to avoid danger of fabric breaks which might occur if the hose were hung over a rod or in a rope loop. To prevent the suspended ends of the hose swinging in the wind with possible danger of damage to the couplings or of injury to persons in the vicinity, the motion of these ends should be limited with a firmly fastened rope sling.



Method of draining and drying hose

How to Reduce Maintenance Costs

Here are a number of suggestions for the reduction of maintenance costs. These were worked out in practice and have proved their usefulness.

1. At regular intervals, inspect plant and list maintenance work. Note in each case how soon repairs should be made before production would be effected or the job would become an emergency.
2. List jobs in order of importance.
3. Maintenance of production equipment and vital services to have preference over all other work.
4. Keep planning ahead of all work in process so that when one job has been completed, there will be work ready for the men to start on at once. This is important and prevents a desire to stretch work out because the workmen do not see more work in sight.
5. Estimate length of time required to do each job, and for larger jobs plan a progress sheet to show when each stage of the work should be completed.
6. Supply all necessary information to the man before the job starts and as it progresses. Be sure they understand thoroughly just what is to be done.
7. Have all materials checked that will be needed. Be sure they are on the job or readily available.
8. Be sure that the men have all the tools they need and that they are in good order.
9. Arrange for proper lighting, when necessary, if work is to run into darkness.
10. Inspect jobs at regular intervals against the estimate or the progress sheet and keep sufficient notes for study after work has been completed to determine if work could have been done better or in a shorter time and if costs are right. File a record of conclusions for future reference.
11. As far as possible eliminate overtime work.
12. Plan to utilize all of the regular time.

By carefully following this program, maintenance costs in one food plant last year were about $67,000 under 1931, with a gradual reduction each year for the last seven years. Preventive maintenance pays.

How to Prepare Belts for Lacing

If there is one time when an operator is likely to be in a hurry, it is when a belt requires re-lacing during a busy hour. As a general rule, it is at such a time that a belt will demand attention of this kind and, as a direct result, a rough or careless job of trimming and lacing the belt is likely. Carelessness in trimming belt ends has often led to lacing the belt up in such fashion that one edge will be a trifle longer than the other and, under such circumstances, a belt will oscillate on the pulleys, or otherwise travel unevenly.

A good safeguard is to form the habit of using a try square for scoring across the belt ends or ends to be trimmed, running a keen knife blade along the edge of the square. Once scored in this manner, it is quite easy to follow the scored cut free-hand in finishing the trimming job with a knife.

If you are caught without a square, you can make a perfect belt joint with a simple straight edge, by giving both ends of the belt a scoring cut at the same time. This is a trick well worth knowing. Simply double the belt back upon itself on the floor, and turn one end over, laying the two ends of the belt side by side in such manner that the back is up on one end and the face side of the belt is upward on the other, lining the edges right up together. Then lay a straight edge across, after the ends have been brought up even, and hold the straight edge so it looks square to the eye. Make a scoring cut across both ends.

Some plants have overcome all trouble with reference to cutting belt ends square, just by using a special belt trimmer for the purpose. The knife in the belt trimmer operates on the same principle as the knife of a paper trimmer, having a slicing motion as it descends.

The Food Industry News

GENERAL NEWS, BUSINESS TRENDS, MEN, JOBS AND COMPANIES • MAY, 1939

Seek Delay in Labeling Under Federal Food Law

Two bills were introduced last month to extend the effective date of the affirmative labeling and coal tar color provisions of the new Federal Food, Drug and Cosmetic Act to Jan. 1, 1940. Introduced by Representative Lea, the latest bill (H. R. 5762) is a substitute for his earlier measure (H. R. 5630). The new bill would authorize the Secretary of Agriculture to postpone the effective date of the label provisions with respect to containers bearing inseparable labels, manufactured prior to Feb. 1, 1939, and in cases where compliance with such provisions would be unduly burdensome by reason of causing the loss of valuable stocks of such containers. The House passed this bill on April 19.

These provisions supplement that of the first bill which would extend the effective date of the requirement that there be stated on the label the common names of ingredients of foods and drugs, the name of the manufacturer and distributor, directions for use and net weight of contents. Postponement is also provided for the provision preventing shipment of coal-tar colors.

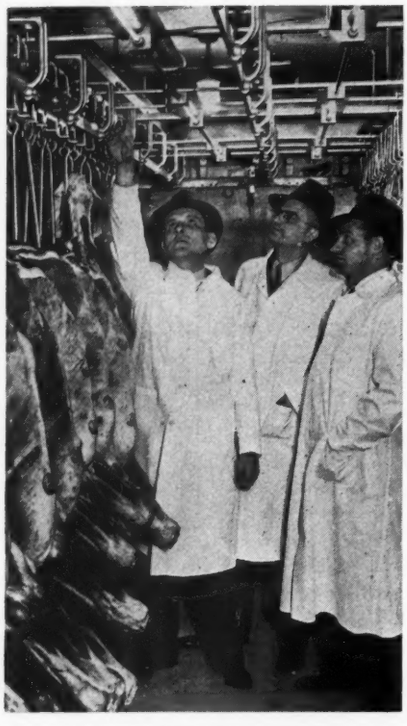
F&DA Makes Progress On New Food Standards

Rapid progress is being made by the Food & Drug Administration with respect to hearings on standards of identity and a limited number of standards of quality for manufactured foods. Full hearings have been held on several groups of commodities, including particularly tomato products and certain canned fruits and canned vegetables. Other hearings are scheduled for early May, including those for cream and certain milk products.

In brief the scheme for establishment of standards is: Specialists of the administration formulate the proposed standards. Formal notice of 30 days or more is given of hearings at which any interesting party may appear. A legal representative from the solicitor's office of the Department of Agriculture is the presiding officer and exercises certain judicial functions. The Food & Drug Administration by attorney and technical experts presents its recommendations. Suggestions and criticisms are received from all who choose to appear.

Following the hearings, as those of mid-January on tomato products, the presiding officer reviews the hearing record and makes a suggested finding of facts, conclusions and a tentative order. That order with respect to tomato juice was published April 11, including a brief review of the testimony, findings of fact and the proposed standard of identity. It is provided that within ten days of receipt of the report containing such findings and conclusions, any interested person may file objections and enter a protest against any action of the presiding officer upon which he desires to argue for changes. In all other cases the same plan will be followed. Briefs in argument are also permissible, both after the hearing (but before the presiding officer makes his findings) and as a part of the protest regarding the presiding officer's action or findings.

In the case of canned peaches the issue was broadened very considerably by the testimony of representatives of the corn products industry who urge that dextrose and other corn sirup products should be permissible as sweetening agents within the standards of identity and standard of quality. This action indicates that the whole question of the definition of sugars and the requirements as to labeling will be subject to extensive argument before the Department. This is one of the fundamental issues that may seriously delay the completion of Department procedure for fixing of various standards for many classes of foods. More testimony on sugar will be presented at a hearing on May 1.



KROGER MAKES BEEF TENDER

Following research at Mellon Institute, Kroger Grocery & Baking Co., Cincinnati, has put to commercial use the ultraviolet method of tenderizing beef developed by Westinghouse. Dr. M. D. Coulter, Mellon Institute, points to the ultraviolet lamps which protect the meat from mold and bacteria while it ages rapidly at higher than usual storage temperatures. With Dr. Coulter are C. L. Arnold, Kroger Food Foundation director, and Frank B. Willis (right) superintendent of meat distribution for the Kroger plant.

"Area of Production" Defined by Andrews

In an attempt to clarify the confusion in industry, Administrator Andrews on April 19 defined the meaning of "area of production" under the Fair Labor Standards Act. He said that an individual shall be regarded as employed in the "area of production" in handling, packing, storing, ginning, compressing, pasteurizing, drying, preparing in their raw or natural state, or canning of agricultural or horticultural commodities for market, or in making cheese, or butter or other dairy products:

(a) If he is engaged in such work on a farm and on agricultural or horticultural commodities produced exclusively on such farm, or

(b) if the agricultural or horticultural commodities are obtained by the establishment where he is employed from farms in the immediate locality and the number of employees in such establishment does not exceed seven, or

(c) with respect to dry edible beans if he is so engaged in an establishment which is the first concentration point for the processing of such beans into standard commercial grades for marketing in their raw or natural state.

(e) With respect to perishable or seasonal fresh fruits and vegetables if he is engaged in handling, packing, storing, drying, preparing in their raw or

natural state, or canning such products for market in an establishment which is located in the open country or in a rural community and which obtains all of its products from farms in its immediate locality . . . "Open country" or "rural community" shall not include any city or town of 2,500 or greater population . . . "immediate locality" a distance of not more than ten miles.

Food Stamps Circulate First in Rochester

Rochester, N. Y., will be the first of half a dozen cities to try out the federal plan of distributing surplus foods through normal channels of trade by means of stamps. The program probably will get under way there about the middle of May, with full experimental operation some time in the summer.

One of the two plans to be tried in Rochester allows a WPA worker to request a deduction in wages of an amount equal to at least $1 and not more than $1.50 a week for each member of his family. In return the worker will receive a corresponding value of orange stamps which will be good for the purchase of any food. Blue stamps, representing 50 per cent of the value of the orange stamps, will be given free, but they will be good only for foods designated as surplus. Stamps will be redeemed by the government.

The second plan allows from $1 to $1.50 in orange stamps to be bought by any person receiving general relief, old-age assistance, aid to dependent children and aid to the blind. Fifty cents worth of blue stamps will be given free for every dollar paid for orange stamps.

CAPITAL VIEWS

SUGAR BATTLE—Corn products manufacturers have asked recognition of their carbohydrates as permissible in canned peaches and other important manufactured foods. Department officials are hesitant about blanket recognition without declaration upon the label. Cane sugar refiners and beet producers are more than jittery. Label controversies may result in mud slinging. But the ultimate difference of technical opinion will inevitably be as to the comparative cost for the various sugars which are acceptable food constitutents because dietetically safe for the user. The *real battle* will be one of competition for food manufacturers' business, even when the appearance of the fight turns to questions of nutrition, labeling and the properties of the foods as affected by the character of the sugar used.

NEW COLOR NAMES—New standards and specifications for permissible coal tar colors to be used in foods were announced during April. Those who wish to employ these commodities must continue to use only colors from batches which have actually passed the approval tests of the government. Color users will have to get acquainted with an entirely new set of both common names and scientific names, as the new standards fully revise the names to be put on the goods. But coordination with old names is clearly shown by the government specifications.

BARTER PLANS—The food industries will not be directly affected in their trade by any deals between Uncle Sam and John Bull or others exchanging American cotton and wheat for foreign minerals or other materials wanted for military reserves. Politics will definitely forbid any barter which would put American agricultural materials into active competition with similar goods being sold commercially. If Britain should take some millions of bushels of wheat, this would go into military reserves and not be available for current milling and marketing, according to the definite assurances from the White House, State Department and Congress.

NAMING LARD SUBSTITUTES—Makers of hardened vegetable oils sold as lard substitutes are much encouraged by the government finding that such general names are acceptable without label declaration of the details of the fat formula used in making Crisco, Spry, *et al.* The official ruling recognizes hydrogenated fats and oils and hardened fats and oils as being proper terms, sufficiently informative to purchasers because well understood through long usage. However, *mixed* fats and oils, only part of which have been hardened, must show ingredient listings on the label.

FOOD SURPLUS—The plan for orange and blue stamps for WPA workers has developed many complications, including local politics. Realists still believe that bootlegging such stamps back to the Treasury regardless of the kind of goods bought with them may prove the final undoing of the plan. Ultimate decisions on this and related farm matters will be governed by Washington's enthusiasm to give more agricultural income every year regardless of the channel through which the money is piped from the Treasury back to the farm.

TWO FATS LOBBIES—The "soap lobby" representing domestic industries wishing to use imported fats and oils is to be directly opposed by a new fats-and-oils lobby representing domestic producing interests. Leading the new group are the dairy industry spokesmen, famed as one of the most potent "pressure groups" in Washington. When politics has to referee such a controversy of big voter forces the easiest "out" is to pass no new legislation. Pressure pro and con seems likely, therefore, to keep the present international trade in fats and oils pretty much in *status quo.*

EFFECTIVE DATE—Congress and the Department are not likely to listen with any favor to proposed general postponement of the effective date for the new food and drug law. But after June 25, officials will be cooperative and reasonable, if industry folks show clear evidence of sincere effort to comply as promptly as conditions permit.

New Technologic Facts Reported by Chemists

New information in food technology and nutrition was revealed in papers presented at the meeting of American Chemical Society in Baltimore, April 3-7. It was reported by Z. I. Kertesz, New York State Agricultural Experiment Station, that the addition of soluble salts of alkaline earths causes canned tomatoes better to retain their firmness. The effect is to bring about formation within the tissues of gelatine-like salts of the naturally present pectic acids which support the cell structure during the destructive action of heat.

Contrary to the general belief that citrus fruits and tomatoes are the richest sources of vitamin C, Dr. Donald K. Tressler and Katherine Wheeler, New York State Agricultural Experiment Station, and Prof. Charles G. King, University of Pittsburgh, said that freshly picked parsley, broccoli, kale and cauliflower contain two to three times as much of the vitamin as citrus fruits. Freshly harvested kohlrabi, New Zealand spinach, parsnips and cantaloups contain approximately the same percentage of vitamin C as does orange juice.

Benzoates are useful in the fish industry for treating round fish and fillets to extend their keeping quality, according to C. R. Fellers and E. W. Harvey, Massachusetts State College. And the bactericidal action of the benzoates is increased by the addition of acids or by using benzoate salt-benzoic acid mixtures.

Corn has much higher food value than has generally been recognized, it was reported by D. Breese Jones, chief, and J. P. Divine of the Bureau of Chemistry and Soils. This was concluded from feeding tests in which freshly ground yellow corn was the only source of protein.

Volatile acids are a satisfactory measure of spoilage in canned salmon. The method for their determination has been simplified and improved until canned salmon can be tested in about fifteen minutes, according to Harold J. Loeffler.

What the food law means to the food manufacturer was discussed by L. V. Burton, editor of FOOD INDUSTRIES. Practical compliance with the law involves a challenge to the food technologists of the industry, he said.

Turkey Cuts Duties

Among Turkish tariff concessions granted the United States in the newly negotiated trade agreement between the two countries is a percentage reduction of 75 per cent or more in general rates of duty on dried prunes, canned prunes, prune juice and canned asparagus. Concessions to Turkey include duty reductions on dried figs valued at 7 cents or more per pound, shelled filberts and raisins made from seedless grapes.

North Carolina, Nevada, West Virginia Enact Complete New State Food Laws

While some food manufacturers are seeking to postpone enforcement of the new federal food act, North Carolina has joined Indiana (see FOOD INDUSTRIES, April, 1939, page 223) in aligning its laws with the federal measure. Nevada and West Virginia have also passed new food laws, but these differ from the federal statute in important respects.

The North Carolina Food, Drug and Cosmetic Act (Senate Bill No. 232) was ratified April 3 in order "to render the provisions of the state law and the enforcement and administration of the same uniform with federal legislation." It is fairly consistent with its federal prototype. Only minor changes have been made in the two important sections, 10 and 11, which correspond with federal Secs. 402 and 403 on the adulteration and misbranding of food products.

A few descriptive words have been added to Sec. 10 and the federal provision on the coloring of citrus fruit has been omitted. Otherwise the corresponding sections are alike.

The only change in Sec. 11 is in paragraph *(k)* which deals with the label declaration of any artificial flavoring, artificial coloring, or chemical preservative. The federal provision in respect to butter, cheese or ice cream has been omitted and another provision has been added. North Carolina Sec. 11 concludes by reading: "Provided, further, that for the purpose of complying with the provisions of this Act, as it pertains to bottled soft drinks, either the bottle crown or the crown together with the blown-in-the-bottle or annealed - to - the - bottle statements, now in usual and common use in this State, shall be deemed sufficient labeling and no paper label shall be necessary."

The North Carolina Act is effective January 1, 1940, except for immediate enforcement of the section giving authority to the Commissioner of Agriculture to promulgate regulations and to conduct hearings for the purpose of fixing and establishing, for any food, reasonable definitions and standards of identity, reasonable standards of quality and fill of containers. Definitions and standards so promulgated shall conform so far as practicable to those promulgated by the Secretary of the United States Department of Agriculture. Regulations shall become effective on and after the effective date of the Act as the Board of Agriculture shall direct.

Unlike the North Carolina Act, there is no provision in the new Nevada Food, Drug and Cosmetic Act requiring the listing of food ingredients on the label. Nevada Sec. 7 on misbranded foods corresponds to Federal Sec. 403 through paragraph *(e)* and then omits Federal paragraph *(f)* on the conspicuousness with which required information is to be placed on the label. Federal paragraph *(g)* is reduced to the statement [paragraph *(f)* of the Nevada section]: "If it purports to be or is represented as a food for which a definition and standard of identity, quality, and fill of container has been prescribed, unless it conforms to such standards of identity, quality and fill."

Federal paragraph *(h)* of Sec. 403, which deals with the labeling of foods below standard, and paragraph *(i)* requiring the listing of ingredients, are omitted in the new Nevada law. Federal paragraphs *(j)* concerning foods for special dietary uses and *(k)* on labeling of artificial flavoring and coloring and of chemical preservatives are carried over into the Nevada law practically intact.

Nevada Sec. 6 on adulterated food is more consistent with Federal Sec. 402. Outside of the addition of a few descriptive words, the main change is in the omission of Federal paragraph *(a)* (2) on added poisonous or deleterious substance and the omission of the provision on coloring citrus fruit. A new paragraph has been added to Nevada Sec. 6 which states that a food shall be deemed to be adulterated "If it falls below the standard of purity, quality or strength which it purports or is represented to possess."

The Nevada law (Assembly Bill No. 149) became effective on its approval date, March 27.

Effective June 2, 1939, is Art. 2, Chap. 19 of the Code of West Virginia, 1931, as amended and reenacted by House Bill No. 192. The term agricultural products is first defined as being "livestock and livestock products, poultry and poultry products, fruits and fruit products, vegetables and vegetable products, grains and hay and the products derived therefrom, tobacco, syrups, honey and other products derived from the business of farming; including such other products as may be manufactured, derived, or prepared from agricultural products, raw or processed, which are used as food for man or other animals."

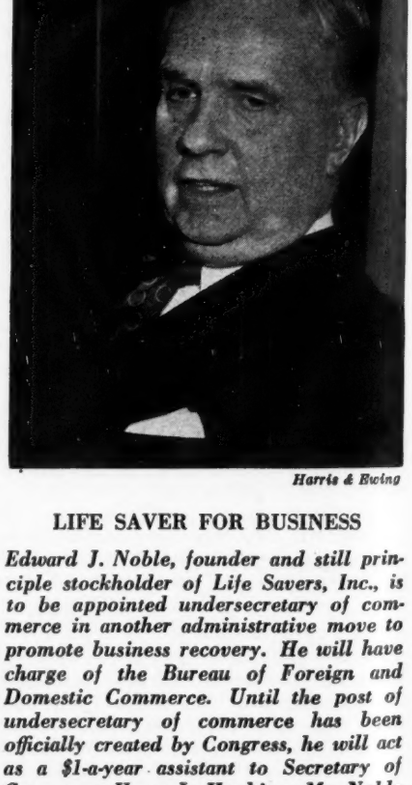
West Virginia Art. 2 then defines what agricultural products may not be sold. Included under this heading are infected, filthy, putrid products or those packed under unsanitary conditions. The container must not be composed of any poisonous or deleterious substance or be formed or filled as to be misleading. No substance can be substituted wholly or in part therefor, nor can any substance be added for the purpose of increasing the product's bulk or weight, reducing quality or strength, or making it appear better or of greater value. Damage can not be concealed and the labeling must not be false. The product can not be sold under the name of another food, and must be labeled "imitation" if it is an imitation of another food. The label must identify the producer, manufacturer or handler, and must contain an accurate statement of the quantity of the contents.

Art. 2 places under the jurisdiction of the Commissioner of Agriculture the marketing of agricultural products in the state and the grading, classification and standardization of such products.

National Dairy Drive To Be Made in June

June is to be the time for high-powered nation-wide promotion of milk and its products. Aligned behind the promotional effort are the principal factors of the dairy industry: National Cooperative Milk Producers' Federation, National Dairy Council, Milk Industry Foundation, American Butter Institute, National Cheese Institute, International Association of Milk Dealers and International Association of Ice Cream Manufacturers. Cooperating in the campaign will be food, drug and variety stores, restaurants, railroads and bus and air lines. More than 50,000 stores of the food and drug chains and thousands of independents have agreed to participate.

Dairy product promotion will be spread across the pages of newspapers, will be talked in nation-wide radio



Harris & Ewing

LIFE SAVER FOR BUSINESS

Edward J. Noble, founder and still principle stockholder of Life Savers, Inc., is to be appointed undersecretary of commerce in another administrative move to promote business recovery. He will have charge of the Bureau of Foreign and Domestic Commerce. Until the post of undersecretary of commerce has been officially created by Congress, he will act as a $1-a-year assistant to Secretary of Commerce Harry L. Hopkins. Mr. Noble has resigned as administrator of the civil aeronautics authority.

hookups and included in point of sale displays and advertising tie-ins. A wide assortment of display material is being prepared under the supervision of National Dairy Council for fountains, restaurants and stores. Window action displays, cut-outs, pamphlets, vehicle cards and booklets also will be employed.

The reason for all this is an old story—there is a surplus of dairy products.

Information on Freezing Heard at Texas Meeting

Problems in the preservation of foods by freezing were discussed by authorities at the conference held at the University of Texas, Austin, under sponsorship of American Society of Refrigerating Engineers, April 13–14. Outstanding among the papers was that of Gerald A. Fitzgerald, chief chemist, Birds Eye Laboratories, which covered quality control of frozen foods production. Mr. Fitzgerald said that quality control requires establishment of higher standards than those required by the Federal Food, Drug and Cosmetic Act. And after a quality control technic has been established by a packer, the person in charge of quality should be responsible only to the management and not to the head of the production department. An important point made by Mr. Fitzgerald was that sanitation in the plant plays a more important part in quality control of frozen foods than of canned foods, because the former are not sterilized by heat at the end of the process. Consequently, canners who produce frozen foods need a new type of factory technic. The criterion of satisfactory equipment for the production of frozen foods is the ease with which it may be cleaned, and as a rule it should be self-cleaning. As an example of the proper type of equipment he cited an installation at Hillsboro, Ore. There the packing line contains one long continuous belt including the five operations of blanching, cooling, draining, culling and packaging, the belt being sterilized during each revolution as it passes through the blancher. Speaking of protection during distribution, Mr. Fitzgerald said that packaging materials which will pass more than one gram of moisture vapor per square meter of surface per 24 hours at 70 deg. F. and a humidity differential of 50 per cent will be inadequate for storing products a full year at 0 deg. F. In respect to storage he pointed out that products held at 20 deg. F. lose their quality to a large extent in six to eight weeks while at 0 deg. F. the quality remains stable for a year. He also emphasized the need for accurate control of temperatures in the warehouse, as poor warehousing can ruin an otherwise excellent product.

Talking on bacteria and other spoilage factors, Jesse Q. Sealey, Texas Technological College, told the technologists that spoilage changes occur in frozen foods as in fresh foods, only much more slowly. Bacteria decrease in number in frozen foods but many survive, he said. So frozen food should be stored at temperatures around 0 deg. F. Bacterial toxins if allowed to develop in or enter the foods at any stage will not be destroyed by freezing. Freezing can not be expected to improve the quality of foods, with the possible exception of meats, he said.

Freezing is quicker in brine solutions than in sugar solutions, and of the various sirups, freezing is quickest in the least dense solutions. That was information reported by J. G. Woodroof, Georgia Experiment Station, speaking on media for the immersion method of freezing. Agitation of the immersion media enormously increases the speed of freezing, he indicated. For practical purposes a flow of sirup of 4 to 6 in. per second seems most economical and desirable, both in checking super cooling and speeding up freezing.

More than 1,000,000 families in the United States are taking advantage of frozen food locker service, and each family is making an annual saving of at least $50 on its food bill, according to A. A. Geiger, York Ice Machinery Corp. There are more than 3,000 locker plants in operation, he said.

CONVENTIONS

MAY

1– 2—Bakery Sales Association, Drake Hotel, Chicago.
8—Western Confectioners Association, Sir Francis Drake Hotel, San Francisco.
8– 9—Associated Grocery Manufacturers of America, mid-year meeting, White Sulphur Springs, W. Va.
8–10—American Spice Trade Association, Hotel Astor, New York.
8–10—National Cottonseed Products Association, Jung Hotel, New Orleans, La.
9–10—Millers National Federation, Edgewater Beach Hotel, Chicago.
11—American Corn Millers Federation, Morrison Hotel, Chicago.
16–18—Biscuit and Crackers Manufacturers Association of America, Palmer House, Chicago.
18–19—Central Atlantic States Association of Dairy Food and Drug Officials, McAlpin Hotel, New York, N. Y.
18–20—Rice Millers Association, Arlington Hotel, Hot Springs, Ark.
22–25—Confectionery Industries Exposition and Convention of National Confectioners Association, Palmer House, Chicago.
22–26—American Association of Cereal Chemists, President Hotel, Kansas City, Mo.
22–26—American Society of Brewing Chemists, Kansas City, Mo.

JUNE

5– 7—Flavoring Extract Manufacturers Association of the U. S., Hotel Pennsylvania, New York, N. Y.
5– 9—Association of Operative Millers, President Hotel, Kansas City, Mo.
18–22—National Association of Retail Grocers, Kansas City, Kan.
23–27—New England Bakers Association, summer meeting, The Balsams, Dixville Notch, N. H.
26–27—National Macaroni Manufacturers Association, Park Central Hotel, New York, N. Y.
26–27—American Fisheries Society, Sir Francis Drake Hotel, San Francisco.
27–29—American Dairy Science Association, Pullman, Wash., and Moscow, Idaho.
27–30—American Dairy Science Association, State College of Washington, Pullman.
28—National Pickle Packers Association, Chicago.

Challenge FTC Authority

Authority of the Federal Trade Commission over food products labels is challenged by Fresh Grown Preserve Corp., Brooklyn, N. Y., and other respondents against whom the Commission filed a formal complaint last January.

The complaint was the first attempt of FTC to assert its jurisdiction over label statements since passage of the new Federal Food, Drug and Cosmetic Act. It is generally regarded as a test case to determine whether the Commission has equal jurisdiction with F&DA. If the Commission is upheld, manufacturers will face a dual responsibility, and not a few view that possibility with considerable alarm.

Make "Rubber" from Whey

Perfection of a process by which a new transparent rubber-like plastic can be made from lactic acid of whey has been announced by the Bureau of Dairy Industry. The new substance is reported to have many valuable uses in industry. It is known chemically as polymethyl acrylate, a water-white semi-solid material closely related to the so-called organic glass used for highway reflectors. It is softer than the glass and very tough and elastic. It can be produced as cheaply from lactic acid by the new method as it is now being made from ethylene or alcohol by the cyanhydrin process. The whey from which the lactic acid is made is produced in the extent of more than 6,500,000 lb. annually as a byproduct of the dairy industry.

Jewel Tea Co. Tries Profit Sharing Plan

Employees of the Jewel Tea Co., Inc., Barrington, Ill., are offered an opportunity to build retirement estates for themselves under a profit-sharing plan put into effect by the company recently. Under this plan, the employee deposits from $1 to $4 per week, and the company contributes to the fund 25 per cent of its net profits each year in excess of cumulative earnings of $3 per share. To start the plan off, the company placed in the trust the sum of $80,555.90.

Upon retirement, a participating employee receives the entire amount of his share of the trust fund. If the employee dies in service or becomes permanently

disabled, the full portion of his share will be paid to him or his beneficiary. In event an employee leaves the company before retirement, he will receive all of his own deposits plus a certain percentage of the remaining credits in his account. This percentage varies from 3 per cent for an employee participating one year in the plan to 76 per cent for an employee participating 19 years.

The contributions made to the trust fund by the company are divided proportionately in two ways among the employees. One-half of the contribution is divided on the basis of the employee's earnings and the other half on the basis of the employee's deposit.

The plan, which is entirely voluntary, will provide old-age security for the Jewel Tea Co. workers.

Develops New Outlets For Dairy Byproducts

New outlets for byproducts of the dairy industry are being developed by research at the Bureau of Dairy Industry of the United States Department of Agriculture, as revealed in the annual report by O. E. Reed.

Bureau scientists have developed a method for making casein fiber and have applied for public service patents on it. No commercial production has begun in the United States, but it is estimated that Italy will produce 20,000,000 lb. of this product in 1938. Whether or not skimmed milk would be more profitable as made into the fiber than if used as livestock feed, its present greatest outlet, depends on economic conditions.

One commercial plant is now using the method developed by the Bureau to make lactic acid by fermenting the milk sugar of the whey from casein manufacture. This plant has found a market for all of its lactic acid, but more would be made if new uses were found.

Recently the Bureau has discovered it is possible to make a resin from lactic acid, which promises to be useful in making varnishes and lacquers that are resistant to alcohol and water and that adhere to metals. Work is now under way also to devise a method of converting lactic acid into acrylic acid for use in making plastic glass. Another achievement in the utilization of casein whey is the Bureau's new process for recovering the milk sugar somewhat more cheaply than formerly. This reduction in cost is made possible by the value of the two byproducts of the process, the soluble albumin and a residue rich in flavins. The former is useful in infants' foods and the latter is used in concentrated forms by feed manufacturers.

Wheat Prospects Good

According to the April estimate of the U. S. Department of Agriculture, a winter wheat crop of 549,219,000 bu. is now in prospect. This compares to 686,637,000 bu. harvested last year and a 1927–1936 average of 546,396,000 bu. When to this is added a normal spring wheat crop of around 200,000,000 bu. and a carry-over from the 1938 crop of 280,000,000 bu., it is apparent that the 1939 domestic wheat supply will be between 950,000,000 bu. and 1,000,000,000 bu. As exports from the 1938 crop will not total much over100,000,000 bu., it is apparent that wheat exports must increase, or a large carry-over will be made into the 1940 crop year.

Construction News

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1939 (thousands)
Bakery	$2,085	$40	$439
Beverages	370	120	1,507
Canning and Preserving	.....	80	160
Confectionery	.....	.....	.....
Grain Mill Products	2,145	.....	210
Ice Manufactured	25	40	255
Meats and Meat Products	440	.....	382
Milk Products	230	180	461
Miscellaneous	1,340	155	744
	$6,635	$615	$4,158

Fish Freezing Plants Made Record in 1938

More than 186,000,000 lb. of fisheries products, valued at $12,500,000, were frozen in 1938. This quantity was an all-time record, according to the U. S. Bureau of Fisheries. It was 11 per cent above the 1937 output, 4 per cent over 1936, and 24 per cent over 1935, according to the report.

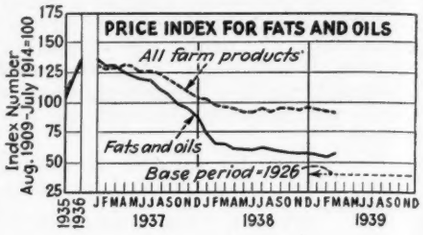
Most important among the products frozen was haddock fillets, accounting for 11 per cent. Next came salmon at 10 per cent, then whiting and rosefish at 9 per cent each, halibut, at 8 per cent, and pollock fillets at 6 per cent.

Large Output Expected For Fats and Oils

While production of edible fats and oils from domestic and imported materials reached record levels in the United States in 1938, it is expected that production in 1939 will be approximately as great. This trend is brought out in the most recent survey of the fats and oils situation made by the Bureau of Agricultural Economics.

Cottonseed oil production was very high in 1938 and, with a much smaller cotton crop in prospect this year, considerably less cottonseed oil is expected to be available. However, hog production has returned again to normal levels and, consequently, lard output this year should be much higher than last, perhaps 360,000,000 lb. more. Also, 1939 is expected to show larger production of butter and soybean, corn and peanut oils.

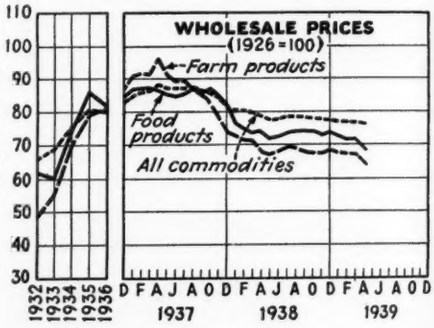
This general supply situation for the food fats and oils makes unlikely any

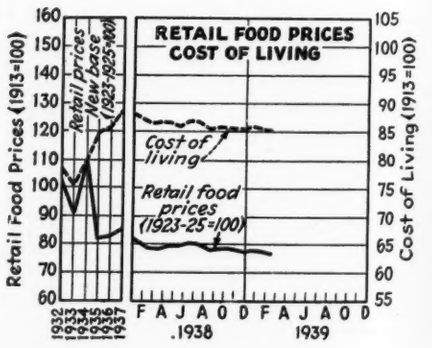


marked upward trend in prices this year, unless the international situation should become much more serious than at present.

Food Commodity Prices Resist War Threats

Almost two months of recurring European crises have had little effect upon basic food commodity prices. Wheat, No. 2 hard winter, which stood at 66½ cents on Feb. 15, ad-





vanced to 68¾ cents on April 15. Corn, No. 3 yellow, was at 47¾ cents on Feb. 15 and 49 cents on April 15. Beef advanced from 16 cents on the earlier date to 18 cents on April 15, while pork loins fell 1 cent from 18½ cents in the same period. Eggs, in step with the season, fell from 18¼ cents to 16½ cents in the same two months. Butter fell 3 cents from 26¼ cents in the same period, withdrawal of government support and large current production being active factors in the move. Cottonseed oil was steady at 5½ cents. Principal canned foods showed no change in price. Coffee and cocoa showed little price change.

This picture of mixed trends, as

presented by the prices of food commodities, is quite in line with the performance of commodities in general. During the two-month period from Feb. 11 to April 15, the general index for commodity prices of the *New York Journal of Commerce* fell from 75.4 to 74.9, four-fifths of this drop occurring in the first of the two months. Among the component parts of this index, grains and foods rose, as did pulp and paper and building materials, while textiles, non-ferrous metals, paints and chemicals fell. Iron and steel held steady.

In any case, it is apparent that the market for commodities has been without strong trends in recent weeks. This, in fact, has been true for the past six months. Recurring war scares cause brief movements up or down, depending upon the commodity, after which prices return to approximately their former levels.

Business Activity Drop Caused by Coal Stoppage

Users of the chart on this page which shows "Trends Affecting Market for the Food Manufacturers' Products," will note a serious drop in the index of business activity. This drop occurred between April 1 and April 8, and amounted to 4.6 percentage points. No one should be unduly alarmed by this move, which does not mark any new trend, but merely registers the stoppage of coal mining pending the renewal of the coal labor contract.

Data for the Curves

In preparing the curves shown on this and the succeeding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* fats and oils, Bureau of Raw Materials for American Vegetable Oils and Fats Industries.

INDICATORS

CONFECTIONERY and competitive chocolate products sales in February were 2.7 per cent over January sales, according to the U. S. Department of Commerce, which also reported these sales to be 0.5 per cent above February, 1938.

FLOUR PRODUCTION reached a high level in March, according to *Northwestern Miller,* which reported an output of 5,891,642 bbl. in that month by mills representing 60 per cent of U. S. production. This was the highest March production for these mills in four years.

HOG SLAUGHTER, federally inspected, in March totaled 3,229,120 hogs, the largest number for the month since 1933, when 3,601,776 hogs were slaughtered.

BUTTER, creamery, produced in February, 1939, was 121,065,000 lb., compared to 112,399,000 lb. in February, 1938, and a 1930–37 average for the month of 110,347,000 lb.

CHEESE OUTPUT in February, 1939, totaled 27,175,000 lb. This production was 9 per cent less than the February, 1938, figure, but was the third largest February output in 21 years.

EVAPORATED MILK PRODUCTION of 137,882,000 lb. in February, 1939, was the largest ever reported for February and was 6 per cent over February, 1938.

OLEOMARGARINE SALES in February, 1939, as indicated by sales of revenue stamps, were 26,873,250 lb., 24 per cent below the 35,558,970 lb. sold in the same month of the previous year.

FRUITS, frozen, in storage on April 1, 1939, totaled 91,056,000 lb., compared to 101,959,000 lb. on the same date in 1938, and a 1934–38 average of 61,573,000 lb. for the date.

VEGETABLES, frozen, in storage on April 1, 1939, amounted to 51,287,000 lb., compared to 23,869,000 lb. a year earlier.

BUTTER, creamery, in storage on April 1, 1939, totaled 78,806,000 lb., compared to 14,947,000 lb. on April 1, 1938, and a 1934-38 average of 9,537,000 lb. for the date.

CHEESE, all kinds, in storage on April 1, 1939, amounted to 81,644,000 lb., compared to 77,042,000 lb. a year before and 1934–38 average of 72,243,000 lb. for the date.

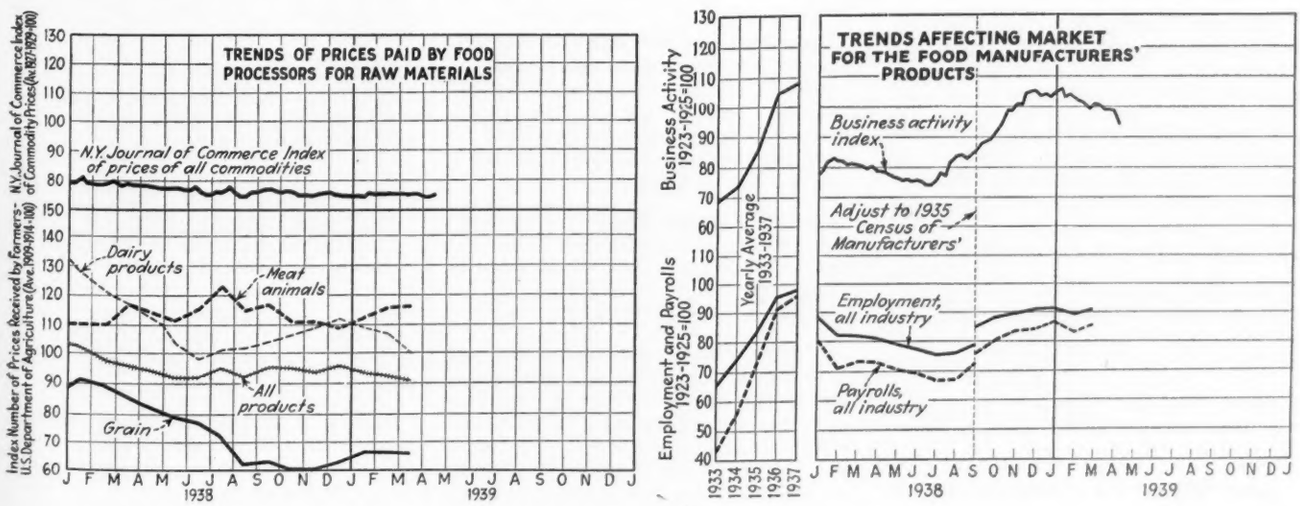
EGGS, case equivalent, in storage on April 1 of this year were 2,823,000 cases. This compares to a 1934–38 average for April 1 of 2,811,000 cases, and a total of 4,059,000 cases on April 1 a year ago.

POULTRY, all kinds, in frozen storage on April 1, 1939, totaled 90,965,000 lb., compared to 78,819,000 lb. on April 1, 1938, and a 1934–38 average for April 1 of 85,310,000 lb.

MEAT, all kinds, in cure and storage, on April 1 this year amounted to 627,901,000 lb. The figure for April 1, 1938, was 667,233,000 lb., while the average for April 1 for the past five years was 773,339,000 lb.

LARD in storage on April 1, 1939, totaled 129,047,000 lb., compared to 121,316,000 lb. on April 1, 1938, and a 1934–38 average of 138,813,000 lb. for the date.

WEEKLY FOOD INDEX of Dun & Bradstreet stood at $2.27 on April 7, a new low for the past four years.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
Index Number of Prices Received by Farmers—U.S. Department of Agriculture (Ave. 1909-1914=100)
N.Y. Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939
Business Activity 1923-1925=100
Employment and Payrolls 1923-1925=100
Yearly Average 1933-1937
1933 1934 1935 1936 1937
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business activity index
Adjust to 1935 Census of Manufacturers'
Employment, all industry
Payrolls, all industry
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939

Men, Jobs & Companies

INDUSTRY

Armour & Co., Chicago, will take over the plant of Carroll Packing Co. now under construction at Prairie du Chien, Wis.

Borden Co. has opened a new ice cream plant at Dallas, Tex. Modern architecture features the plant.

Canada Dry Bottling Co., Jacksonville, has opened a new plant with the latest in modern equipment.

Coca-Cola Co. has completed a $1,000,000 sirup plant in Dallas, Tex., and the Coca-Cola Bottling Co., Dallas, is building a $40,000 addition to its factory.

Dairymen's League Cooperative Association, Inc., will build a $75,000 dairy plant at Auburn, N. Y.

Devon Bakeries, Inc., New York, has purchased its own building in West New York, N.J., and installed new equipment for making melba toast.

Flour Mills of America, Inc., Kansas City, Mo., has filed application for reorganization under the Chandler Act. The company is a $6,000,000 concern.

H. Fox & Co., Brooklyn, N. Y., has moved to a new location and installed modern equipment for the manufacture of sirups and crushed fruits.

Frankenmuth (Mich.) Brewing Co. has purchased Kentucky Brewing Co., Louisville. The latter, a $350,000 property, went into bankruptcy in 1935.

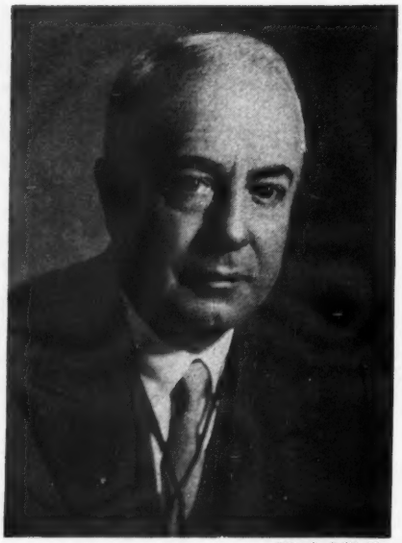
Fruitvale Canning Co., Inc., Oakland, Calif., has acquired the properties and equipment of B. H. Body Co. New equipment will be installed.

General Mills, Inc., Minneapolis, will construct new plants at Buffalo this year, at a cost of about $2,000,000. The new facilities will be for the manufacture of breakfast cereals and other packaged goods and for storing flour.

Hershey Creamery Co., Harrisburg, Pa., will build a $40,000 ice cream distributing plant and warehouse at Altoona, Pa.

Jones Pies, Inc., Elizabeth, N. J., will move into a new $100,000 plant on Route 29, Hillside, N. J.

King Midas Co., Minneapolis, has taken over the Daisy mill and elevator property in Superior, Wis.



Blank & Stoller

WILBER C. COOK

He has been elected president of Ward Baking Co., New York, and a member of the board of directors. For the past three years he has been vice-president of E. H. Rollins & Sons, Inc., New York investment bankers. Mr. Cook has also been one of the owners of George L. Dyer & Co., advertising and merchandising counsel.

La Rose Macaroni Manufacturing Co., Brooklyn, N. Y., on May 1 will begin construction of a new factory, with 100,000 sq.ft. of floor space, in Putnam, Conn.

Loft, Inc., has the right to approximately 91 per cent of the stock of Pepsi-Cola Co., it was ruled in the Supreme Court of Delaware last month. Charles H. Guth, former president of Loft, Inc., had endeavored to obtain control of Pepsi-Cola Co.

Carl F. Mogg, Inc., Youngstown, Ohio, is expending $200,000 in an expansion program. The firm recently bought the plant of Standard Coated Products Co., New York.

S. & W. Fine Foods, Inc., is opening a branch office in Chicago. With headquarters on the West Coast, the company has been operating in Chicago in a limited way for about a year and a half. William Leeds, formerly Chicago sales manager for the Sprague, Warner & Co., has been appointed divisional manager.

Schroeder Milk Co. has merged with Stuber Bros.' Dairy to form City Dairy Co., St. Paul.

Howard B. Stark Co., Milwaukee, has taken over two departments of American Candy Co., of which Mr. Stark was formerly vice-president.

Swift & Co. has purchased Conway Produce Co., Conway, Ark.

Taystee Bread Co., Nashville, Tenn., has completed a new plant and added eighteen new trucks. Total cost of its improvements amounts to about $150,000.

Tolibia Cheese Co.'s warehouse was destroyed and the Dow Cheese Co. partially destroyed by fire March 16 at Fond du Lac, Wis., with estimated damage of $100,000.

CORRECTION

Oscar Mayer & Co. says that it has not purchased an interest in Milner Provision Co., as reported in this column last month.

PERSONNEL

C. Richard Arnold, formerly with the technical service division of American Bottlers of Carbonated Beverages, Washington, D. C., is now with the research department of American Maize Products Co., Roby, Ind.

Bruce Ashby, one time director of sales and advertising for Postum Co., has been appointed director of advertising and sales promotion for Ruppert Brewing Co., New York.

Dorothy E. Balmanno has been advanced from the experimental kitchen of Borden Co. to director of the company's food service department.

E. E. Carlson, Elroy, Wis., has been elected president of National Creamery Butter Makers Association.

James S. Crutchfield, president and one of the founders of American Fruit Growers, Inc., Pittsburgh, has become chairman of the board. William H. Baggs, vice-president and general manager, becomes president.

Dr. L. H. Evans has been transferred from Sperry Flour Co., Vallejo, Calif., to the General Mills research laboratories, Minneapolis.

Sam P. Evans has been advanced from Kansas City (Mo.) branch manager of Kroger Grocery & Baking Co. to assistant to the western division manager at St. Louis.

H. A. Flager has been made general manager of Alaska Salmon Co., San Francisco, succeeding C. E. Cocks.

John Hopkins, former Omaha sheriff and city commissioner, has been elected vice-president of Fontenelle Brewing Co., Omaha.

Fred W. Huntzicker, Greenwood, heads up Wisconsin Cheese Producers' Cooperative.

E. H. Jacobsohn is the new president of Olive Oil Association of America, Inc.

C. L. Johnson, manager of the Omaha branch plant of Beatrice Creamery Co., has been transferred to Des Moines as assistant to the vice-president.

Gerald S. Kennedy, since 1920 with Washburn-Crosby Co., Buffalo, has been moved to Minneapolis as director of operations control of the parent company, General Mills, Inc.

Albert Kirschstein of Milwaukee again heads up American Brewers' Association.

Harry A. Laing has retired as general traffic manager of Libby, McNeill and Libby after 30 years with the company. Albert W. Bankert succeeds him.

Edward Landsberg, president of United States Brewing Co., Chicago, has been elected president of United States Brewers' Association to succeed the late Colonel Jacob Ruppert.

WILLIAM F. R. MURRIE

He again heads Association of Cocoa and Chocolate Manufacturers of the United States. Mr. Murrie is president of Hershey (Pa.) Chocolate Corp. William K. Wallbridge, president of Peter Cailler Kohler Swiss Chocolates Co., Inc., Fulton, N. Y., was named vice-president.

Frank E. Lauppe has been named president of Buffalo Brewing Co., Sacramento, Calif., succeeding Frank J. Rhustaller, who retired after 26 years as president.

Chase W. Love has been appointed general manager of Horlick's Malted Milk Corp., Racine, Wis.

A. L. McDonald, Ann Arbor, Mich., has been elected president of Michigan Association of Ice Cream Manufacturers.

R. M. Page, Jr., succeeds L. L. Clemmer as manager of Butter-Kist Baking Co., Rock Hill, S.C.

Harry Smiley has been named manager of Bell Bakeries, Inc., Youngstown, Ohio.

Max Stahl, superintendent of Keeley Brewing Co., has received the 1939 Max Henius Achievement Award.

Stanton E. Van Wie, former advertising and sales promotion manager of Beech-Nut Packing Co. and R. B. Davis Co., has joined National Tea Co., Chicago, in a similar capacity.

Jean Vernet, directing chef of Geo. A. Hormel & Co., Austin, Minn., has been made superintendent of the Flavor-Sealed division. He succeeds Laurence W. Murphy, now head of a new department of research and development.

Lewis E. White will have charge of sales and merchandising of Lippincott Co., Cincinnati, in his new capacity as assistant to the president.

Henry C. Whiteford has been made general manager of Hillsboro-Queen Anne Cooperative Corp., Baltimore.

DEATHS

Joseph T. Bell, 75, founder of the J. T. Bell & Co. packing plant, Cheyenne, Wyo., recently.

G. S. Lackie, for many years treasurer of Canners League of California, March 10.

Charles Latchem, 68, an organizer of Wabash (Ind.) Baking Powder Co. and Wabash Canning Co., recently.

Charles C. Martin, 72, founder and president of Martin Bros. Co., Denver, March 29.

John A. McCarthy, 68, president of Pennsylvania Sugar Co., Philadelphia, April 4.

Roy J. McColgan, 43, president and general manager of M. & B. Ice Cream Co., Saginaw, Mich., March 8.

Joseph N. Powell, 84, identified with the Wisconsin cheese industry for years and former president of National Cheese Makers Association, at Utica, N. Y., March 26.

Walter J. Shuford, 65, former president of Catawba Creamery Co., Hickory, N.C., March 25.

William M. Van Vechten, 76, founder and until recently president of Van Vechten Milling Corp., Rochester, N.Y., March 28.

ASSOCIATED INDUSTRIES

Anchor Hocking Glass Corp. has appointed R. Bruce MacFarlane sales manager of the Closure Division, Anchor Cap & Closure Corp., Long Island City, N.Y.

Continental Can Co., Inc., New York, has appointed Jack E. Baldwin assistant general sales manager, packers cans.

E. & O. Collett & Co., Oslo, Norway, has named R. W. Greef & Co., Inc., New York, sales agents for its vitamin A and D concentrates.

First Machinery Corp., New York, has moved all its warehouses, offices and machine shops into one central plant.

Fritzsche Bros., Inc., New York, has established branch offices at Cincinnati and Cleveland. James R. Eller is in charge of the Cincinnati office, while James F. Shumaker heads up the Cleveland branch.

Gaylord Container Corp., St. Louis, has added a new corrugated box factory at Greenville, S.C.

Lincoln Electric Co., Cleveland, Ohio, has opened a factory branch in Seattle, Wash.

National Adhesives Corp., New York, has added a lacquer research laboratory and technical service department to its lacquer division at Dunellen, N. J.

National Can Corp. has named Edward H. DuBois Midwest sales representative of the packers can division, with headquarters at Hamilton, Ohio.

Owens-Illinois Can Co. has assigned John S. Pedersen to the Illinois and Iowa territory.

Pfaudler Co., Rochester, N. Y., has added Robert Laws, specialist in canning processes and non-corrosive metals, to its staff of sales engineers. He will cover Wisconsin, Michigan, Illinois, Indiana, Kentucky, Iowa, Missouri and part of Ohio, devoting all of his time to the canning industry.

Stearns Magnetic Manufacturing Co., Milwaukee, has appointed Vernon Whiting sales representative for the northern section of Texas.

Toledo Scale Co. is constructing a five acre building for the home office and factory at Toledo. The new structure will consolidate six different plants.

Byproduct Recovery

(*Continued from pgae 263*)

a solution of the material in distilled water. Laboratory tests are also made to check on the removal of salts and proteins. These tests include determination of sulphates, chlorides, calcium (lime) and heavy metals.

The wet crystals from the centrifugal, spread on trays and loaded on rack trucks, are dried in the tunnel dryers for 2 to 3 hours at 180 deg. F. Circulating air for the dryers is filtered through oiled, glass wool air purifiers, to reduce the possibility of contamination of the milk sugar from dust or other matter introduced with the air.

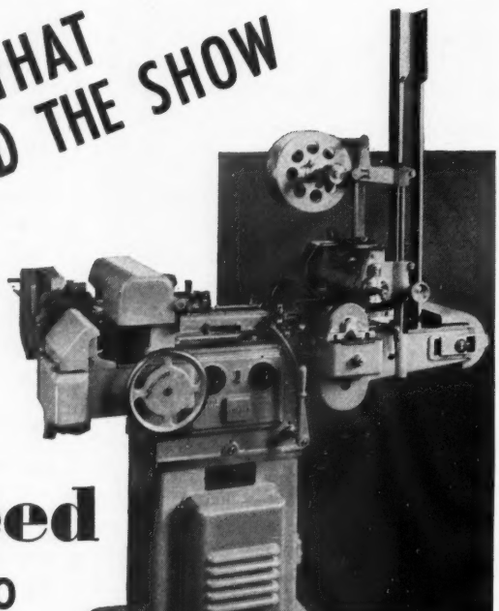
Trays of dried milk sugar are dumped into a hopper which is kept closed except during the dumping operation. From the hopper, the sugar is fed to a pulverizer in which it is reduced to fineness of approximately 100 per cent through a 100 mesh screen. After pulverizing, the sugar is packed in 200 lb. and 300 lb. barrels. These barrels have liners of fine, unbleached muslin next to the sugar and outer liners of waterproof paper.

Laboratory tests of the finished product are made, to insure that it meets the specifications of the U.S. Pharmacopoeia.

In addition to meeting these specifications, there are additional requirements necessary to satisfy certain customers. These customers are engaged in processing lactose and their requirements concern mold growth. For these customers, the product must contain no molds and tests must be made to check this requirement. Bacteria counts are also made on the finished lactose.

Yield of U.S.P. milk sugar from this process is 90 per cent of the milk sugar contained in the crude sugar of each batch. Note, however, that there is complete utilization of the milk sugar, as the first wash water goes to the crude sugar and poultry feed manufacturing process described in the preceding article, while the remainder of the wash water goes back into the U.S.P. milk sugar refining process as solution water for each batch.

THE MACHINE THAT STOPPED THE SHOW



New
High Speed

Wraps up to 380 packages per minute

Demonstrated at the recent Packaging Show, our new CM-2 amazed onlookers by shooting out perfectly wrapped packages at 380 per minute.

As impressive as its high speed, is the machine's smooth, quiet operation . . . evidence of sound construction.

The CM-2 was specially built to wrap comparatively small packages, and is easily adjusted for the different sizes. Uses plain, moisture-proof, or heat-sealing transparent cellulose in roll form. Speed depends upon the size and nature of the package being wrapped—runs from around 250 to 380 per minute. The machine occupies very little floor space—3'6"x4'3¼".

Today, *speed* is machinery's answer to rising costs—and for this reason the CM-2 fills a real need.

Write for our CM-2 Folder

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES

Peterborough, England: Baker Perkins Ltd. Melbourne, Australia: Baker Perkins Pty., Ltd.

Mexico, D. F., Apartado 2303 Buenos Aires, Argentina: David H. Orton, Maipu 23

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

How to Use Lactic Acid

(*Continued from pgae 253*)

and water respectively needed to obtain 125 gal. of a mixture, having an acid content of 11 per cent acid by volume calculated as acetic, we find:

1. $A = \frac{P \times D \times W}{100 \times s} = \frac{90 \times 11 \times 125}{100 \times 11}$
   = 112.5 gal. of 11 per cent distilled vinegar.
2. $a = \frac{p \times D \times W}{100 \times s} = \frac{10 \times 11 \times 125}{100 \times 37.3}$
   = 3.68 gal. of 50 per cent lactic acid.
   3.68 gal. × 9.36 (wt. of 50 per cent lactic acid per gal.) = 34.4 lb. of 50 per cent lactic acid.
3. $w = W - (A+a) = 125 - (112.5+3.68) = 8.82$ gallons of water to add

Example 2

It is desired to make 75 gal. of a mixture of acid containing five per cent acid by volume. The ratio of acetic to lactic acid is to be 7:1. The materials to be used are: cider vinegar, testing 5.2 per cent or 52 grains; and lactic acid, testing 50 per cent.

- A = Amount of cider vinegar to be determined.
- a = Amount of lactic acid to be determined.
- w = Amount of water to be determined.
- D = 5 per cent acid, desired strength of mixture (calculated as acetic acid by volume).
- S = 5.2 per cent, or 52 grains, strength of cider vinegar.

s = 37.3 per cent, strength of lactic acid (calculated as acetic acid) by volume from 50 per cent lactic acid by weight.

W = 75 gallons volume of mixture desired.

$$\text{Ratio desired} = \frac{7 \text{ parts acetic acid}}{1 \text{ part lactic acid}} \text{ or } \frac{87.5 \text{ per cent acetic}}{12.5 \text{ per cent lactic}}$$

P = 87.5 per cent of mixture is to be acetic acid.

p = 12.5 per cent of mixture is to be lactic acid.

Substituting in the formulas to determine the number of gallons of cider vinegar, lactic acid and water, respectively, needed to obtain 75 gal. of a mixture having an acid content of 5 per cent by volume, calculated as acetic, we find:

1. $A = \frac{P \times D \times W}{100 \times S} = \frac{87.5 \times 5 \times 75}{100 \times 52}$
   = 63.1 gal. of 5.2 per cent cider vinegar.
2. $a = \frac{p \times D \times W}{100 \times s} = \frac{12.5 \times 5 \times 75}{100 \times 37.3}$
   = 1.26 gal. of 50 per cent lactic acid
   or
   1.26 gal. × 9.36 lbs. (weight of 50 per cent lactic acid per gal.) = 11.79 lb. of 50 per cent lactic acid
3. w = W − (A+a) = 75 − (63.1 + 1.26) = 10.64 gal. of water to add.

Example 3

It is desired to make 200 gal. of a mixture of acid containing 4 per cent acid by volume. The ratio of acetic to lactic acid is to be 3:1. The materials to be used are cider vinegar testing 4 per cent or 40 grains and lactic acid testing 50 per cent.

A = Amount of cider vinegar to be determined.

a = Amount of lactic acid to be determined.

w = Amount of water to be determined.

D = 4 per cent acid, desired strength of mixture (calculated as acetic acid by volume).

S = 4 per cent, or 40 grains, strength of cider vinegar.

s = 37.3 per cent, strength of lactic acid (calculated as acetic acid by volume) from 50 per cent lactic acid by weight.

W = 200 gal. of mixture desired.

$$\text{Ratio desired} = \frac{3 \text{ parts of acetic acid}}{1 \text{ part of lactic acid}} \text{ or } \frac{75 \text{ per cent acetic}}{25 \text{ per cent lactic}}$$

P = 75 per cent of mixture is to be acetic acid.

p = 25 per cent of mixture is to be lactic acid.

Substituting these figures in the formulas to determine the number of gallons of cider vinegar, lactic acid and water, respectively, needed to obtain 200 gal. of a mixture having an acid content of 4 per cent by volume (calculated as acetic), we find:

1. $A = \frac{P \times D \times W}{100 \times S} = \frac{75 \times 4 \times 200}{100 \times 4}$
   = 150 gal. of 4 per cent cider vinegar
2. $a = \frac{p \times D \times W}{100 \times s} = \frac{25 \times 4 \times 200}{100 \times 37.3}$
   = 5.36 gal. of 50 per cent lactic acid
   5.36 gal. × 9.36 lbs. (weight of 50 per cent lactic acid per gal.) = 50.2 lbs.
3. w = W − (A+a) 200 − (150 + 5.36) = 44.64 gal. of water to add.

Some manufacturers might desire to add the acid on a gravimetric or weight basis rather than on a volumetric or volume basis which is the customary practice. For those who might wish to use the weight method, examples 4 and 5 are given to show the method of calculating for this procedure.

Example 4

It is desired to make 750 lb. of a mixture of acid containing 9.85 per cent acid by weight (10% by volume). The ratio of acetic to lactic acid is to be 9:1. The materials to be used are distilled vinegar testing 10.8% by weight (11% by volume) and lactic acid testing 50% by weight.

A = Amount of distilled vinegar to be determined.

a = Amount of lactic acid to be determined.

YOUR *Office Girl* COULD DO IT!

TRI-CLOVER SANITARY PUMPS are simply constructed and trouble-free. No complicated parts. So easy to take apart your office girl could do it. "Gentle push" principle of the screw impeller, an exclusive patented feature of TRI-CLOVER PUMPS, prevents foaming and agitation.

There is a TRI-CLOVER pump to meet *your* requirements — suction lift or gravity feed — over twenty models in stainless steel and Tri-alloy (a high nickel content nickel alloy).

TRI-CLOVER manufactures the COMPLETE LINE of sanitary fittings—*all sizes, all metals.* Nation-wide distribution through leading supply houses insures prompt service. Write for the name of your nearest TRI-CLOVER dealer.

TRI-CLOVER MACHINE COMPANY, 2809 Sixtieth St., Kenosha, Wis.

TRI-CLOVER • SANITARY PUMPS, FITTINGS, VALVES AND TUBING

w = Amount of water to be determined.

D = 9.85 per cent or 985 grains, desired strength of mixture (calculated as acetic acid by weight).

S = 10.8 per cent or 108 grains, strength of distilled vinegar by weight.

s = 33.3 per cent strength of lactic acid calculated as acetic by weight (50 per cent lactic by weight).

W = 750 lb. of mixture desired.

$$\text{Ratio} = \frac{\text{9 parts acetic acid}}{\text{1 part lactic acid}} \text{ or } \frac{\text{90 per cent acetic}}{\text{10 per cent lactic}}$$

P = 90 per cent of mixture is to be acetic acid.

p = 10 per cent of mixture is to be lactic acid.

Substituting these figures in the formulas to determine the number of pounds of distilled vinegar, lactic acid and water respectively needed to obtain 750 lb. of a mixture having an acid content of 9.85 per cent by weight (calculated as acetic), we find:

1. $A = \frac{P \times D \times W}{100 \times S} = \frac{90 \times 9.85 \times 750}{100 \times 10.8}$
   = 615.6 lb. of 10.8 per cent distilled vinegar.
2. $a = \frac{p \times D \times W}{100 \times s} = \frac{10 \times 9.85 \times 750}{100 \times 33.3}$
   = 22.18 lb. of 50 per cent lactic acid
3. w = W − (A+a) = 750 − (615.6 + 22.18)
   = 112.22 lb. of water to add.

NEW! Starches SPECIFICALLY FOR PIE FILLINGS!

"PURITY" STARCH FL—For Fruit and Lemon Pies in which no milk is used.

"PURITY" STARCH M—For Cream, Chocolate, and other pies made with milk.

Both these starches offer unique practical properties found in no other starches. They are *tasteless*—do not "blanket" the flavor of the other ingredients. They set to a smooth, creamy body, firm, yet free from lumps and graininess. Fillings made with them have a rich sparkle—no dull cloudiness.

We invite your inquiries, and shall be glad to send you one or more trial bags on approval, from our nearest factory. Sets of tested and proven formulae for various types of pie fillings made with these starches are yours for the asking.

FOOD STARCH DIVISION
NATIONAL ADHESIVES CORP.
816 GREENWICH STREET, NEW YORK

PURITY

Example 5

It is desired to make 500 lb. of a mixture of acid containing 4.95 per cent acid by weight. The ratio of acetic to lactic acid is to be 7:1. The materials to be used are cider vinegar testing 5.14 per cent by weight (5.2 per cent by volume) and lactic acid testing 50 per cent by weight.

A = Amount of cider vinegar to be determined.

a = Amount of lactic acid to be determined.

w = Amount of water to be determined.

D = 4.95 per cent, or 49.5 grains, desired strength of mixture (calculated as acetic acid).

S = 5.14 or 51.4 grains, strength of cider vinegar.

s = 33.3 per cent, strength of lactic acid, calculated as acetic acid by weight from 50 per cent lactic acid by weight.

W = 500 lb.; weight of mixture desired.

$$\text{Ratio} = \frac{\text{7 parts acetic acid}}{\text{1 part lactic acid}} \text{ or } \frac{\text{87.5 per cent acetic}}{\text{12.5 per cent lactic}}$$

P = 87.5 per cent of mixture is to be acetic acid.

p = 12.5 per cent of mixture is to be lactic acid.

Substituting these figures in the formulas to determine the various weights of cider vinegar, lactic acid and water, respectively, needed to obtain 500 lb. of a mixture having an acid content of 4.95 per cent by weight (calculated as acetic), we find:

1. $A = \frac{P \times D \times W}{100 \times S} = \frac{87.5 \times 4.95 \times 500}{100 \times 5.14}$
   421.3 lb. of 5.1 per cent cider vinegar
2. $a = \frac{p \times D \times W}{100 \times s} = \frac{12.5 \times 4.95 \times 500}{100 \times 33.3}$
   = 9.29 lbs. of 50 per cent lactic aci.
3. w = W − (A+a) = 500 − (421.3 + 9.29)
   = 69.41 lb. of water to add.

How much will it cost? The answers will be described in Part II, to be published in June. Don't miss it.

References

1. Fabian, F. W. and Wadsworth, C. K. Experimental work on lactic acid in preserving pickles and pickle products. (Unpublished at this time.)
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What Is Satisfactory Carbonation?

(*Continued from page 261*)

A very fine quality sparkling water was run in the Technical Service Laboratory to see how it behaved during these handling steps. In the bottle, the water contained 4.5 volumes of carbonation and was at a temperature of 42 deg. F., which is an excellent serving temperature. Using clean, cooled glasses of ordinary size, here are the results obtained:

Original carbonation in bottle..	4.5 volumes
Very carefully poured glass....	4.0 volumes
Average poured glass.....	3.4 volumes
Roughly poured glass.....	2.9 volumes
Poured over cracked ice and spoon	2.3 volumes

Note that this product of very high quality could be made inferior by careless serving. This water was still quite pungent at 3.4 volumes, and would give off numerous bubbles on the tongue, but was noticeably on the poor side at 2.3 volumes.

Another factor can be easily shown at this time, namely, the effect of temperature on the behavior of the product. Using another bottle of sparkling water identical with the one above, the same routine was carried out, differing only in that the water was at room temperature of 82 deg. F. The result follows:

Original carbonation in the bottle	4.5 volumes
Very carefully poured glass....	3.1 volumes
Average poured glass.....	2.1 volumes
Poured over cracked ice and spoon	1.7 volumes

From this it is quite obvious that it is wise to serve carbonated water well cooled.

The question immediately arises as to what would happen if the carbonation were raised. Therefore, some of this water was carbonated to 5.5 volumes. With this carbonation, the water was found to be very touchy, if not "wild," and threw off an excessive amount of gas during the dispensing. Even with the higher original carbonation, the best that could be obtained when cooled to 42 deg. F. and poured with great care into a glass was a gas content in the glass of 4.1 volumes. This compares with 4.0 volumes in the first experiment using the lower carbonation. When this higher carbonated water was poured in an average manner into a glass the carbonation after pouring dropped to 3.2 volumes. This showed a definite loss as compared to the 3.4 volumes in the water with the lower carbonation. In other words, the increased amount of gas made the "gas tension" in the water so great that when the beverage was agitated the carbonation became "wild," carrying out more than a normal amount of the gas.

It has been found unwise to carbonate sparkling water much beyond the range of 4.5 volumes, and probably for most cases slightly under this figure. This fact is not alone connected to excessive gas loss. With higher pressures, severe service is placed on the bottle crown. As a bottle is warmed in storage, the pressure tends to rise. According to one of the leading crown manufacturers, the crowns put on with even the best of machinery can be expected to begin to leak gas when the pressure becomes only slightly in excess of 100 lb. per square inch. As a result, water carbonated to 4.5 volumes cannot be stored at temperatures higher than 95 deg. F., while 5.5 volumes must not be warmer than 85 deg. F. Many bottlers do not have good crowning conditions, due to wear of their equipment, and their bottled beverages start to develop crown leaks at much lower temperature. For this reason, it would be wise to keep carbonation low.

Even though many bottlers do observe these points just mentioned and

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use reasonable amounts of carbonation, their products still have a tendency to bubble vigorously when opened and lose a large amount of gas when poured into the glass, thereby seeming to go dead in a short time. In the majority of cases, this difficulty can be traced to a number of fine particles either suspended in the water or found on the inside walls of the bottle. As an example, a sparkling water which showed suspended matter obvious in the bottle when the water was examined by strong cross-lighting was run in the same manner as was the first water mentioned. This latter water was the same carbonation as before, 4.5 volumes, and the water was poured into the glasses at a temperature of 42 deg. F. The results follow:

Original carbonation in bottle..	4.5 volumes
Very carefully poured glass....	3.0 volumes
Average poured glass.....	2.6 volumes
Poured over ice and spoon....	2.1 volumes

When these results are compared with those of the sparkling water first mentioned, it becomes quite obvious that the particles suspended in the water had a very deleterious effect on the carbonation.

These particles are generally spoken of as nuclei on which bubbles form, and experimentally with unusually clean apparatus it has been possible to go to excessive carbonation without any tendency for bubbles to form when the pressures are released. It is therefore believed that in the majority of cases these particles are necessary to let the gas unload. And those particles showing negative charge are the most likely to cause this phenomenon, for some particles without the necessary charge will not cause gas bubbles to form.

Where the water is extremely clear and bright, and the bottle well washed, with clean inner surface, bubbles will form very slowly on the glass surfaces and rise slowly to the surface, giving a very slow bubbling. If, however, there are a number of active particles or nuclei present, bubbles will form rapidly in the body of the liquid. If the bottle is dirty, the bubbles will form at excessive rates on the glass surface. In general, the elimination of such difficulties is through better clarification of the water used, or better cleaning of the inside of the bottles, although old bottles which have become mottled on the inside will also cause trouble. Occasionally, particles causing this effect will come from extracts or flavoring agents.

A logical question is often asked as to whether there is any other way that the gas can come out of a carbonated beverage than through bubbles. The answer is that the gas can leave by diffusion. In general, however, this is such a slow action that it can almost be completely disregarded.

Rapid bubble formation in a beverage may indicate life at the particular moment, but the bottle which will stay alive the longest on standing is one which may appear almost dead when opened and will bubble only when given a shake. It is not possible to get both maximum sparkle and long open-bottle life in the same bottle.

In final recommendation, it should be pointed out that there are some inherent differences in the clarity of water, in flavoring ingredients and in the carbonating and filling equipments used in various plants, all of which influence the behavior and stability of the carbonated beverages produced. Therefore, every product should be adjusted in its carbon dioxide content until it gives the best all around behavior during the four necessary steps of opening, dispensing, standing and testing.

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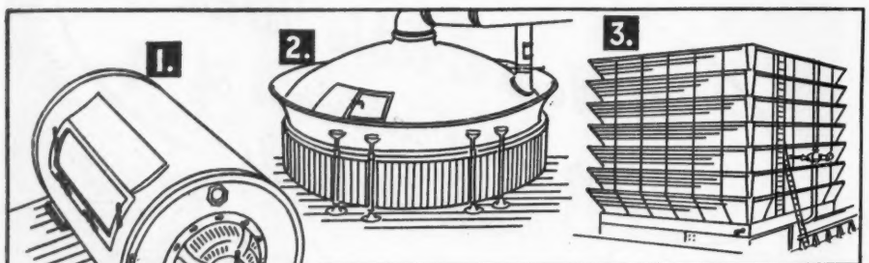

1. To prevent off-flavors and lowered quality in butter, it is essential to keep churns free from bacterial contamination. In addition to the regular thorough rinsing and cleansing, they should be treated before each use with a 200 p.p.m. solution made from HTH Products.

2. In breweries, HTH Products protect product quality by dependable sterilization of all utensils, pipe lines, filtermass, fermenters, bottles and bottle-fillers, etc.

3. Algae in condenser water causes slime in cooling towers, cuts down the efficiency of the refrigerating system. Ice plants use HTH Products to kill algae in cooling water, also to insure pure water for making ice.

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Food Technology

(*Continued from page 277*)

BEVERAGES

Pasteurizing Grape and Apple Juice

GRAPE AND APPLE JUICES can be successfully pasteurized in open kettle, continuous flow ribbon, or Electropure pasteurizers. A temperature of 140 deg. F. reduces the number of micro-organisms in grape juice to such an extent that when the pasteurized juice is inoculated with a pure wine yeast this will predominate and control the fermentation. Heating in an open kettle to 165 deg. F. destroys all microorganisms. At this temperature, with the other types of pasteurizers only a very few organisms survive and those are of a type which would not cause spoilage if the juice is handled properly.

Rapid cooling of the pasteurized juice allows considerably more bacterial growth than a gradual air cooling. Similar results are obtained with apple juice using temperatures of 150 and 170 deg. F.

Low temperature pasteurization of grape juice would be advantageous where the juice is held overnight to allow suspended matter to settle out. Pasteurizing does not appreciably affect the chemical composition of the wines, nor is there any cooked or off flavor, even after fermentation.

Digest from "Preservation of Grape Juice. V. Pasteurization of Grape and Apple Juices for Storage or Immediate Fermentation," by E. Arthur Beavens, Harry E. Goresline and Carl S. Pederson, *Food Research*, 3, 467, 1938.

How To Get Arsenic Out of Wine

BECAUSE ARSENICAL INSECTICIDES, used in vineyards, will carry some arsenic into wines in spite of precautions, a simple and effective treatment for removing traces of arsenic has been developed. A specially prepared ferric oxide, known in the trade as "Prestal," is employed for the purpose. The amount of arsenic actually present is accurately determined for each wine before dearsenizing, and the treatment is adjusted accordingly. Ferric oxide is itself quite insoluble in wine, but is very effective in removing arsenic.

The operation can be accelerated by passing carbon dioxide into the wine during treatment. Another expedient, which is especially helpful for dearsenizing musts in tanks, is forced circulation of the liquid by means of a pump.

Digest from "Dearsenizing Wines," by W. Petri, *Vorratspflege und Lebensmittelforschung* 1, 318, 1938 (Published in Germany).

Ripeness of Hops for Brewing

PRACTICAL BREWING TESTS with unripe, normally ripe and very ripe hops show what differences are introduced into beer by the stage of ripeness. Each lot of hops was analyzed for resin content and for other features of composition. Worts were also analyzed for comparison of the effects of hops in different stages of ripeness.

Differences were observed in the worts, and in the color and flavor of the beer, but the variations were not sufficiently characteristic to give much information which would be useful to the brewer. Tabulation of the numerical results from a large number of analyses, coupled with comparison of the properties of beers corresponding to the analyses, did not bring out any constant or dependable relationships. The information now available does not give the brewer any clear cut guiding facts from which he can say that hops in one stage of ripeness will give one set of prop-

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MUNDET CORK INSULATION

erties to beer, while hops at an earlier or later stage will give certain other properties. Ripeness, therefore, is not a factor which can be utilized to control quality of beer.

Digest from "Influence of Ripeness on Brewing Value of Hops," by P. Kolbach, R. Rehberg and G. Wilharm, *Wochenschrift für Brauerei* 55, 321, 1938. (Published in Germany).

Iron Contamination in Wine Making

GRAPE JUICE dissolves appreciable amounts of iron from iron crushers and must lines during wine making, red wine taking up more than white. This is especially true of the first juice through the equipment. However, by the time fermentation is complete, the iron content of the wine is about the same as that of the original grapes. The excess iron is largely precipitated with the yeast in the crude lees (yeast sediment) during fermentation. Further iron may be taken up during cellar handling and storage. The lees from a storage tank is relatively low in iron.

Digest from "Changes in Iron Content of Musts and Wines during Vinification," by E. M. Fessler, *Food Research*, 3, 307, 1938.

This pictorial chart indicates the tremendous rate of growth of insect pests in a sixty-day period unless controlled.

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BAKING & MILLING

Bread Without Yeast By Pressure Carbonation

A RECOMMENDED PROCEDURE for baking bread without yeast, by pressure carbonation, is this: The dough in the mixer is prepared from 1,000 parts flour (moisture content 13 to 15 per cent), 600 to 700 parts water, as much salt as may be desired, and sufficient acid to impart the necessary acidity. This acid may be 2.5 parts hydrochloric acid, introduced in 15 parts of fine salt; or 1.06 parts hydrochloric acid, introduced in 3.8 parts lactic acid, or 9.2 parts citric acid, added by itself. The closed mixer is operated 5 to 10 minutes while forcing in carbon dioxide under a pressure of 3 atmospheres, after which the dough is allowed to stand 5 to 10 minutes. The pressure is then released and the dough is baked. The effect is comparable to that of yeast or baking powder.

Digest from "Making Bread Without Yeast," by N. A. Iwanow, *Chemisch Weekblad (Rubrick voor Handel en Industrie)* 36, 43, 1939 (Published in Holland).

Staling of Bread Slowed by Soy Flour

CHANGES in the aging of bread crumb were followed by measuring firmness under a standard weighted plunger, by the Katz sedimentation method of determining swelling power, and by the Karacsonyi viscometric determination of absorption capacity. Flour strength (protein content) is an influential factor; breads from low protein flours stale more rapidly than those from high protein flours. Storage temperature is also important. At 11 deg. C. (53 deg. F.) initial staling was rapid, reaching nearly the same level at 24 as at 96 hours. At 28 deg. C. and 42 deg. C. (82 deg. F. and 108 deg. F.) staling was much slower. Compressibility is more sensitive to increasing storage temperatures than is water absorption capacity.

Defatted soy flour is a staleness inhibitor, and its effect is more apparent in warm than in cold storage. At 28 deg. C. and 42 deg. C. the breads from various types of wheat flour remained fresh 4 to 24 hours longer when 1.5 per cent defatted soy flour was included than when the soy flour was omitted.

The tests showed that crumb

characteristics change most rapidly in the first 8 to 12 hours after baking. Beyond that stage the compressibility-time, and absorption-time curves were nearly straight lines. The sedimentation test is inferior to the compressibility and absorption tests both in sensitivity and in accuracy.

Digest from "Relation of Flour Strength, Soy Flour and Temperature of Storage to the Staling of Bread," by W. R. Steller and C. H. Bailey, *Cereal Chemistry* 15, 391, 1938.

CANNING AND PICKLING

To Speed Up "Processing" of Salt Pickles

EXPERIMENTS show that about 95 per cent of the amount of salt that brine pickles are capable of losing after twelve hours in fresh water will come out in the first eight hours. It takes four hours more to get the other 5 per cent. If the processing is successively repeated on the same lot of pickles the same relation holds.

At 38 deg. F., the salt removal is appreciately slower than at 68, 98 and 139 deg. F., though the latter three are much alike.

Pickles of 3,000 to 3,600 size were tested.

Digest from "The Rate of Diffusion of Salt from Pickles during the Freshening Process," by Switzer, Richardson and Fabian. Mich. State College, Technical School for Pickle and Kraut Packers, Feb., 1939.

Dextrose Improves Pickles

DEXTROSE, added to fermenting genuine dill pickles or to salt stock, in amounts of 1 or 2 per cent is generally advantageous.

1. Increases the number of acid-forming bacteria.
2. Speeds the fermentations.
3. Shortens the fermenting period.
4. Slightly higher acidity, and improved keeping power.

About ⅓ to ½ of the total sugar in finished pickles may be supplied by dextrose. It does not change the color but has a decided effect on improved crispness. Also, it increases volume and weight from 3 to 8 per cent, has speedier penetration, but does not effect keeping quality.

Digest from talk by C. R. Fellers at Mich. State College, Technical School for Pickle and Kraut Packers, Feb., 1939.

Canned Fruit and Tin Corrosion

HYDROGEN SWELLS, nightmare of canners, are formed because the tinplate corrodes, and the main factor in corrodibility is the nature of the steel base from which the tinplate is made. Laboratory corrosion tests in dilute citric acid give some indication of the probable life of cans made from the steel, but the tests have a considerable factor of variability. It has been found that more reliable results are obtained by corrosion tests in which the medium is juice of the fruit for which the cans are to be used. There is still much variability in the steels from which tinplate is made. For laboratory testing, the steel can be selected from a single source and treated uniformly, but in actual canning no such uniformity can be achieved.

Tests were made with various steel bases, made up into lacquered and unlacquered cans, with syrups or juices of black currant, cherry, loganberry, strawberry, gooseberry, raspberry and plum as corrosion mediums. Steels were rated as fast or slow corroding, according to their behavior in the dilute citric acid tests. When made up into cans, the slow steels were slightly superior for currents, strawberries and Victoria plums, but were

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definitely inferior for cherries and prunes, all in lacquered cans. This result does not agree with the citric acid tests, but agrees with steel strip tests in the same juices. Gooseberries were tested in unlacquered cans, in which the slow steels were definitely superior. Much additional work is needed to make laboratory tests reliable for judging can performance.

Digest from "Laboratory Corrosion Tests on the Steel Base of Tinplate in Relation to the Storage Life of Canned Fruit," by W. E. Rhodes, *Journal of the Society of Chemical Industry* 57, 315, 1938.

COFFEE

What Is Coffee?

A REPRESENTATIVE composition of Brazilian coffee is: water 12.0; fat 10.0; soluble ash 3.2; insoluble ash 0.1; caffein 1.0; trigonellin 1.0; reducing sugars 1.0; sucrose 6.4; chlorogenic acid 5.7; caffeic acid 0.7; other water-soluble substances 6.0; alcohol-soluble substances 2.5; hemicelluloses 20.2; cellulose 11.2; protein 12.9; and lignin 4.2 per cent.

Coffee was prepared at concentrations from 85 to 280 g. of beans per liter of water, and the amounts of caffein, trigonellin and chlorogenic acid passing into the beverage were measured. The results give a basis for predicting how much of each will be contained in coffee when prepared in a definite manner and at a known concentration.

Analyses of fourteen varieties of coffee from all parts of the world showed 0.8 to 1.2 per cent trigonellin before roasting, but only 0.3 to 0.6 per cent in the roasted beans. Chlorogenic acid ranged from 4.5 to 7.4 per cent in raw and 3.3 to 4.9 per cent in roasted coffee. Apparently roasting destroys only the free chlorogenic acid in coffee. That portion which is present as potassium chlorogenate, in combination with caffein, remains in the roasted beans.

Digest from "Chemistry of Coffee," by Karl H. Slotta and Klaus Neisser, *Berichte der deutschen chemischen Gesellschaft* 72, 126, 1939 (Published in Germany).

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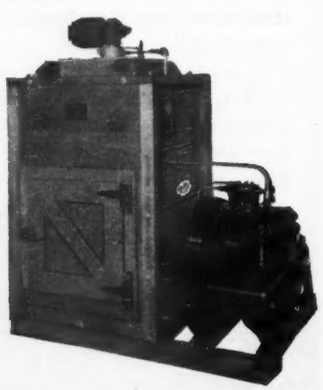

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DAIRY PRODUCTS

Quality Control in Making Swiss Cheese

A STUDY of the making of over 500 Swiss cheeses in Wisconsin and Ohio factories shows that the methylene blue reduction test applied to the milk in the kettle gives a very fair idea of the grade of cheese that will result. If the methylene blue reduction time is under three hours, the chances for a high grade cheese are one in three. With a reduction time of over three hours, two out of three cheeses should be high grade. The chances for a high-grade cheese can be increased to three out of four by making the process such that the pH at dipping is between 6.35 and 6.51. A pH higher than 6.51 at dipping, in other words a "dead", slow-working milk, gives only one high-grade cheese out of eight or ten.

Digest from "The Relation of the Quality of Milk to the Grade of Swiss Cheese," by L. A. Rogers, R. E. Hardell, and F. Feutz, *Journal of Dairy Science* 22, 43, 1938.

Process for Condensing Milk

NEW CONDENSED MILK PREPARATIONS are made by separately evaporating milk and milk serum, according to British Patent 495,746 (granted Feb. 9, 1939, to F. Sornet and G. Etienne, Strasbourg, France). Milk, which may be whole or skimmed, is evaporated to about 30 per cent of its original volume under mild conditions. In particular, the temperature is not

allowed to rise above about 40 deg. C. (104 deg. F.) during the evaporation. Milk sugar is added to this concentrate in the form of a milk serum concentrate. The serum is also evaporated under mild conditions (same temperature limit) to about one-eighteenth of its original weight. The resulting concentrate is rich in lactose (milk sugar). The two concentrates are mixed while still at about 40 deg. C. (104 deg. F.). The product may be preserved in cans.

Crustless Cheese

ACCORDING to a recent invention (British Patent 493,248, granted Nov. 3, 1938, to Fermentata Aktiengesellschaft, Zurich, Switzerland), crustless cheese is made by blending a suitable cheese with 20 to 40 per cent of a thickened whey. The whey, containing all its milk sugar, is pasteurized and fermented with a lactic acid forming organism such as *Bacillus acidophilis* or *Bacillus bulgaricus*. After converting 20 to 35 per cent of the milk sugar to lactic acid, the whey is evaporated down to between 1/7 and 1/10 of its original volume, preferably by vacuum evaporation. It is then heated under pressure at 120 to 125 deg. C. (248 to 257 deg. F.) until only about 10 to 20 per cent of the original milk sugar remains unchanged. The preferred method of incorporating this thickened whey in cheese is to stir it into a cheese melt, or simply into the warm cheese in the case of soft cheese.

MEAT PRODUCTS

Vacuum Rendering for Lard and Tallow

VACUUM RENDERING OF LARD and tallow has several advantages over open kettle and hot water methods. Cracklings can be rendered down to a fat content of about 6 per cent, as compared with about 50 per cent in hot water rendering. And the cracklings are edible.

Introduced into Germany from America for the express purpose of producing better quality lard and tallow, free from any scorched odor, vacuum rendering made little headway at first because the German people demanded fats with the accustomed odor. But the hot water method, which was also developed to provide milder conditions than in open kettle rendering, gave too little prime fat and too much of the second and technical grades.

For this reason, vacuum rendering is gradually being adopted in spite of popular prejudice, and an improved system has been devised which permits highly efficient use of the raw material. The steam-jacketed vacuum kettle has a mechanical stirrer and a vapor outlet which permits the vacuum pump to draw off steam and vapor to a condenser. A charge is rendered in about two hours. The rendered fat is filtered, cooled on a cold roll, weighed and packaged. When well pressed, the cracklings are dry and stable in storage.

Digest from "Rendering Lard and Tallow in Vacuum," by W. Steinmann, *Fette und Seifen* 46, 18, 1939 (Published in Germany).

Pork Beats Beef On Vitamin B

FEEDING TESTS with albino rats have given a comparative basis for evaluating the vitamin B and vitamin G potencies of fresh, dried and cooked

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If you are a production executive in a food plant, we want you to have one of our beautiful new 56-page mixer catalogs without cost. No matter how large or small your operations may be, you will find it to your advantage to look through this book and inspect the splendid equipment which it presents. You may find just the machine you've been looking for to speed up your production without increasing your costs—or to maintain present production at less expense. Size 8½ x 11, containing 133 illustrations and 56 pages, bound in attractive leatherette cover—a definite must for every production man's desk. Send for your copy TODAY while the supply lasts.

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lean beef and pork. Pork has more than 10 times the vitamin B content of beef, and loses about 12 per cent of its original potency when cooked at not above 90 deg. C. (194 deg. F.). Beef loses about 20 per cent of its low vitamin B content when cooked in like manner. When autoclaved 70 minutes at 10 lb. pressure, pork lost about 21 per cent and beef practically all of its vitamin B.

In vitamin G content lean beef and pork are about equal. This vitamin is more stable to heat than is vitamin B. Ordinary cooking and autoclaving caused no appreciable loss.

Digest from "Influence of Cooking and Canning on the Vitamin B and G Content of Lean Beef and Pork," by F. W. Christensen, Esther Latzke and T. H. Hopper, *Journal of Agricultural Research* 53, 415, 1938.

MISCELLANEOUS

Alcohol From Dates

DATE PULP, corresponding to about 85 per cent of the fruit, contains about 21 per cent water, 71 per cent sugar (calculated as glucose), 2 per cent protein, 3 per cent crude fiber and 2 per cent ash. Fat and nitrogen-free extractives make up the remaining 1 per cent of the material. With the exception of their low protein content, dates are therefore well adapted for production of alcohol by fermentation. The nitrogen lack, caused by protein deficiency, can be made up by adding an inorganic source of nitrogen, for example di-ammonium phosphate. Experimental fermentations in which this expedient was adopted gave about 4 gal. of alcohol for each 100 lb. of date pulp. The mash is thus approximately equivalent to a beet sugar mash. The investigation has been carried far enough to show what fermentation conditions give best results, and to give a background of experimental data for further development of the process.

Digest from "Making Alcohol from Dates," by B. Drews, *Zeitschrift fur Spiritusindustrie*, 61, 107, 1938 (Published in Germany); also in *Brennerei-Zeitung*, 55, 58 and in *Deutsche Destillateur-Zeitung*, 59, 195, 1938.

Avoiding Spray Residues On Berries

THE PRINCIPAL DIFFICULTIES encountered in spraying fruits with insecticides and fungicides (toxicity, harmful effects in subsequent canning or processing, and unsightly appearance of the ripe fruit are well illustrated by experience with raspberries in England. The raspberry beetle and cane spot fungus are most effectively and economically controlled by spraying about a week before picking time. This eliminates the possibility of using poisonous ingredients.

Of the non-toxic vegetable insecticides, pyrethrum proved ineffective but derris gave good control of the beetles. Adding Bordeaux mixture to the spray to destroy cane spot fungus, ruined the appearance of the berries. Lime-sulphur disfigured the berries slightly, but not objectionably, and was thought acceptable until canners reported can corrosion from the small residue of sulphur.

Copper oxychloride was then tried and its use proved successful. The residue of copper on the picked berries was so extremely small as to be negligible, and cane spot fungus was controlled. Similar difficulties have been encountered with strawberries, in that the frequent sulphur dusting to control mildew and red spider left too much sulphur on the berries. This was overcome by allowing a suitable time between the last dusting and berry picking time.

Digest from "Problem of Spray Residues on Orchard Fruit," by H. Shaw, *Chemistry and Industry*, 58, 65, 1939 (Published in England).

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BOOKS RECEIVED

INDUSTRIAL ARCHITECTURE OF ALBERT KAHN, INC. By George Nelson. Published by New York Architectural Book Publishing Co., Inc., 112 West 46th St., New York, N. Y. 1939. 176 pages; 9¼x12⅛ in.; cloth. Price $6.

Two important things in respect to industrial buildings are covered in this artistically illustrated volume. One is attractive appearance and the other adaptability to efficient production. In the latter class come such factors as unobstructed floor areas which permit changes in production methods to keep pace with the technic in the industry.

The importance of the production aspects of factory buildings needs no emphasis. But perhaps there are some who have not become entirely aware of the significance of an attractive industrial building in a company's program of public relations. Fortunately, as the book well demonstrates, an efficient design from the production standpoint can be equally effective esthetically, and without extra cost.

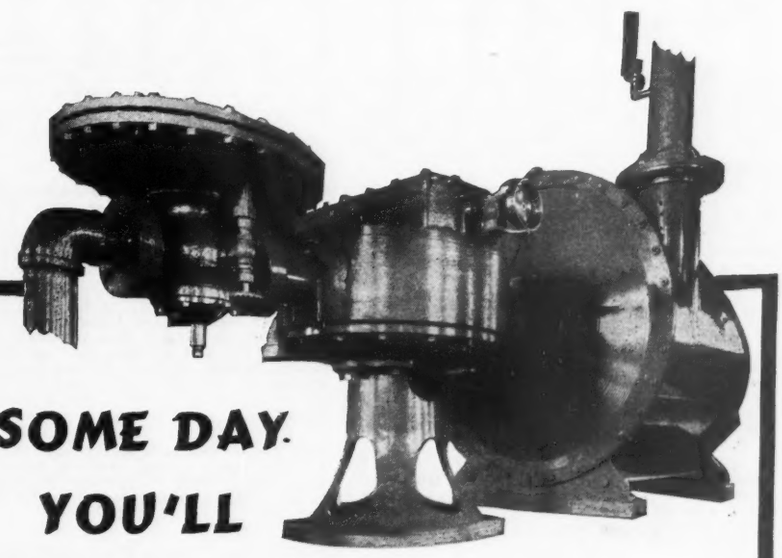
Sixty-two industrial buildings are illustrated, these being in various industries. The illustrations include exteriors and several interiors, together with floor-plan drawings in many instances. The only architectural sample from the food field are the grain elevators of Kellogg Co., Battle Creek, Mich. But that is by no means the only structure adaptable to food plant operations. Take for instance the Lady Esther plant at Clearing, Ill. The efficient straight-line production for which this structure was designed might well be used in a food plant.

AN INTRODUCTION TO INDUSTRIAL MYCOLOGY. By George Smith, with foreword by Harold Raistrick. Published by Edward Arnold & Co., London, England; in United States by Longmans, Green & Co., 114 Fifth Ave., New York, 1938. 302 pages; 5¾x9 in.; cloth. Price $5.20.

Here is a food technologist's sort of book on "moulds" (the author is British) rather than a systematic mycologists's book on all fungi. Any laboratory worker who has had to deal with problems of molding of foods, leather, textiles or other organic matter has frequently encountered molds that defy identification—and sometimes cultivation—with the knowledge of molds that is ordinarily in the possession of a food technologist. But with this book he will go a long way toward the solution of such vexing problems.

In particular, its 127 original illustrations, mainly photomicrographs, are to be complimented, together with these textual explanations. Likewise the chapters on "Equipment and Technique," "Physiology of Fungi," "Control of Mould Growth" and "Industrial Uses of Fungi" are very useful.

The author is obviously familiar with factory problems; and, because he has produced a textbook for beginners who may lack the customary prerequisite training for formal study of mycology, his work deserves a place in the laboratory library.



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PATENTS

Biscuit Doughs in Sheet Form Given Decorative Impressions by a Rotary Die—George Ralph Baker, Petersborough, England, to Baker Perkins Co., Inc., Saginaw, Mich. No. 2,146,786. Feb. 14, 1939.

Soy Bean and Soya Products Improved in Flavor and Odor by Soaking in Water, Subjecting to Gas Under Pressure and to Temperatures of About 0 to 40 Deg. C., and Driving Off Volatile Undesirables With the Gas—Artemy A. Horvath, Newark, Del. to Soya Corporation of America. No. 2,147,097. Feb. 14, 1939.

Elongated Slices of Bread Compressed Across Width Dimension by Narrow Tranverse Webs to Act as Hinges and Permit Folding of Slice in a Continuous Manner to Form a Three-Decker Sandwich—George F. Humphrey, Montreal, to Tridek Corp., Quebec, Canada. No. 2,147,098. Feb. 14, 1939.

Lecithin Triturated Into Starch to Form Improved Cold Swelling and Cold Soluble Starch Products—Frederik André Möller, Groningen, Netherlands, to Naamlooze Vennottschap; W. A. Scholten's Chemische Fabrieken, Groningen, Netherlands. No. 2,147,104. Feb. 14, 1939.

Chocolate and Similar Semi-Liquid or Plastic Commodities Subjected to Air in Fine State of Sub-Division During Conching Operation and Subsequently Freed From the Air to Carry Off Undesired Volatile Constituents—Kai Christian Sophus Aasted, Gentofte, Denmark, in part to Boggild & Jacobsen, Copenhagen, Denmark. No. 2,147,184. Feb. 14, 1939.

Fruit Juices Mixed With Dextrose, Concentrated by Evaporation, and Solidified by Crystallization—Thomas Alvin Bruce, San Mateo, Calif., to Corn Products Refining Co., New York, N. Y. No. 2,147,238. Feb. 14, 1939.

Starch Factory Waste Treated for Recovery of Carbohydrate Fatty Acid Esters—Sidney Mark Cantor, Berwyn, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,147,241. Feb. 14, 1939.

Meats Stabilized During Curing by Treatment With Reducing Sugar and a Nitrite Pickle—Winford Lee Lewis, Evanston, Ill., to Corn Products Research Foundation, Robey, Ind. No. 2,147,261. Feb. 14, 1939.

Pure Yeast Cultures Grown in a Continuous Manner Under Sterile Conditions—Robert Schwarz, White Plains and Albert R. Erda, New York, to Schwarz Laboratories, Inc., New York, N. Y. No. 2,147,271. Feb. 14, 1939.

Animal Protein Cracklings Added to Blackstrap Molasses and Heat Treated to Make Mash Medium for *Bacillus butacone* Fermentation—Horace Edward Hall, Sea Cliff, N. Y. No. 2,147,487. Feb. 14, 1939.

Flour-Like Solids of Citrus Fruits Freed From Juice, Pectin and Oil Combined with Cereal Flour to Make a Citrus-Cereal Breakfast Food—Ramon Bustamante, to Florida Citrus Exchange, Tampa, Fla. No. 2,147,521. Feb. 14, 1939.

Chocolate-Flavored Powder Made by Mixing and Grinding Together Cocoa Powder, Yellow Raw Sugar, Hygroscopic Mineral Salts and Dextrose—Ludwig Rosellius, Bremen, Germany. No. 2,147,549. Feb. 14, 1939.

Shrimps Freed From Shells by Mechanical Means—Viggo Bottker, Seattle, Wash. No. 2,147,633. Feb. 21, 1939.

Anhydrous Coconut Paste With a Melting Point of Approximately 75 Deg. F. Made by Spray Drying—Robert T. Northcutt, Cranford, N. J. No. 2,147,751. Feb. 21, 1939.

Shredded Coconut Made from Hydrated Copra—Robert T. Northcutt, Cranford, N. J. No. 2,147,752. Feb. 21, 1939.

Yeast Foods Used in Bread Making Made to Contain Beta Alanine and Aspartic Acid—Roger J. Williams, Corvallis, Ore., to Standard Brands, Inc., New York, N. Y. No. 2,147,762. Feb. 21, 1939.

Pickles Packed in Containers With Aid of Mechanical Device—Charles G. Lang, to C. C. Lang & Son, Inc., Baltimore, Md. No. 2,147,818. Feb. 21, 1939.

Small Grains Cut into Thin Slices—Thomas A. McDonald, Jr. and Thomas G. Knight, Omaha, Neb. No. 2,147,852. Feb. 21, 1939.

Liquids Irradiated to Give All Constituents a Predetermined Beneficial Dosage of Reactive Ray—Brian O'Brien, Rochester, N. Y. No. 2,147,857. Feb. 21, 1939.

Powdered Pectin and Dextrose Hydrate Mixture Passed Between Hot Rolls to Form Easily Soluble Flakes—Willard E. Baier, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,147,960. Feb. 21, 1939.

Milk Reduced in Bacteria, Leucocytes and Other Foreign and Cellular Substances by Filtering Through Bed of Sand Varying in Particle Size to Pass Through a 25 Mesh and be Retained on a 50 Mesh Screen—Edwin H. Browne, Columbus, Ohio, to M. & R. Dietetic Laboratories, Inc. No. 2,148,100. Feb. 21, 1939.

Soy Beans Freed From Objectionable Odors and Flavors by Treatment With High Temperature Steam in an Atmosphere Containing Ethylene—Robert A. Wait, Decatur, Ill., to Spencer Kellogg & Sons, Inc., Buffalo, N. Y. No. 2,148,142. Feb. 21, 1939.

Wrapped Bread Kept in Fresh Baked State in Static Atmosphere Maintained at a Relative Humidity and Temperature Level of Between 70 and 85 Per Cent at 80 Deg. F. Dry Bulb and 110 Deg. F. Dry Bulb—Hyman Waitzman, Yonkers, N. Y., to Purity Bakeries Corp., Chicago, Ill. No. 2,148,143. Feb. 21, 1939.

Potatoes Pealed in a Machine With a Tiltable Hopper Bowl Fitted With a Bottom Rotatable Disk With Roughened Surface—James J. Wortelboer, Muskegon Heights, Mich. No. 2,148,251. Feb. 21, 1939.

Starch in Cereals Also Containing Non-Starchy Components Dextrinized Under Limited Moisture Conditions—Hans F. Bauer and Herbert F. Gardner, to Stein Hall Mfg. Co., Chicago, Ill. No. 2,148,525. Feb. 28, 1939.

Cheese Plasticized With the Addition of Soya Flour Mixed with a Fatty Edible Material, a Small Amount of Caustic Potash and Water—Charles Doering and W. Kedzie Teller, Chicago to Henry H. Doering, Chicago, Ill. No. 2,148,544. Feb. 28, 1939.

Fermentation Liquors Subjected to Multiple-Effect Evaporation for Recovery of Valuable By-Products—Gustave T. Reich, Philadelphia, Pa. No. 2,148,579. Feb. 28, 1939.

Cheese Plasticized by Heat Treatment in the Presence of a Small Amount of Diammonium Citrate—George L. Teller and W. Kedzie Teller, to Henry H. Doering, Chicago, Ill. No. 2,148,593. Feb. 28, 1939.

Cereals Puffed in Barrel-Like Machine With Opening Through Sides for Discharge of Cereal—Walter J. Charnley, Omaha, Neb. No. 2,148,728. Feb. 28, 1939.

Meats and Vegetables Diced in a Machine Having Feed Roll With Grooves Into Which Dip a Set of Rotary Knives—Joseph P. Spang, Quincy, Mass. No. 2,148,782. Feb. 28, 1939.

Fish Filleted so as to Remove Flesh From Back and Belly by Mechanical Means—William H. Hunt, National City, Calif. to Fish Machinery Corp., San Diego, Calif. No. 2,149,021 and No. 2,149,022. Feb. 28, 1939.

Cereals Puffed in a Rotating Oven Machine Fitted With a Hinge Lid Over the Mouth and a Releasable Catch and Shock Absorbing Device on Lid—Elvin L. Battee, Oakland, Calif. No. 2,149,156. Feb. 28, 1939.

Soluble Food Extract Made From Brewers' Yeast—James Hill Millar, Dublin Irish Free State to Arthur Guinness, Son and Co., Ltd., London, England. No. 2,149,306. March 7, 1939.

Cane Sugar Molasses Containing Non-Crystalizable Sugars and Organic Gums Homogenized With Water to Break Down Gums Into Small Particles and Give a Uniform Solution of Molasses and Water of About 43 Deg. Bé—George H. Lubarsky, to Vitamol, Inc., New York, N. Y. No. 2,149,354. March 7, 1939.

Rotary Tray Bakers Oven—Charles T. Hatch, to Union Steel Products Co., Albion, Mich. No. 2,149,439. March 7, 1939.

Fruits Washed in Machine Equipped With a Rotatable Brush and Means to Move the Fruits Longitudinally Along the Brush Surface—Mabry D. Kennedy and John Gordon Johnson to Ken-Jon Inc., Orlando, Fla. No. 2,149,443. March 7, 1939.

Dried Corn Syrup Made by Spray Drying Methods — Raphael S. Fleming, Syracuse, Frederick D. Parker, Fayetteville, and William Gere Hawley, Syracuse to The Bordon Co., New York, N. Y. No. 2,149,517. March 7, 1939.

Biscuits Baked on Heated Metal Surface Having Means to Permit Escape of Moisture From Underface of Dough—William Presley Morton, Indianapolis, Ind. No. 2,149,537 and No. 2,149,538. March 7, 1939.

Baking Strength of Dough Improved Through the Addition of 0.2 to 5.0 Grams of Ascorbic Acid or Its Alkali Salts Per 100 Kilograms of Flour—Holger Jorgensen, Copenhagen, Denmark to N. V. Noury & Van der Lande's Exploitatie Maatschappij, Deventer, Netherlands. No. 2,149,682. March 7, 1939.

Eggs Tested and Sorted Mechanically on the Basis of Electromotive Force Values—Frederick L. Rivenburgh, Springfield, Ohio. No. 2,149,686. March 7, 1939.

Starch Extracted From Root Crops and Dried—Francis H. Thurber, Arlington, Va. to the people of the United States. No. 2,149,802. March 7, 1939.

Soluble Coffee Made by Drying Concentrated Extract of Green Unroasted Coffee in Thin Layers on Heated Surfaces to Roasting Temperatures—Gerald L. Wendt, New York and Douglas Fonmuller, Middle Village, Long Island, N. Y. to Coffee Products Corp., New York, N. Y. No. 2,149,876. March 7, 1939.

Brewery Mash Treated in Machine Fitted With Rotating Arm Carrying a Plurality of Vertical Stir Having Knife Edge Front and Plow-Like Base Widening to the Back—Robert C. Schock, New Rochelle, N. Y. to Schock, Gusmer & Co,. Inc. Hoboken, N. J. No. 2,150,009. March 7, 1939.

Dextrose Obtained From Impure Dextrose-Containing Liquor by the Addition of Dextrose-Sodium Chloride, Subsequent Concentration, and Separation of Dextrose Crystals—Thomas Harvie Barnard and Paul L. Stern, to Clinton Co., Clinton, Iowa. No. 2,150,146. March 14, 1939.

Dextrose Obtained From Starch Conversion Liquor in Three Separate Crystallizing Steps in Which the Recovered Dextrose-Sodium Chloride is Re-used in the Second and Third Steps—Roscoe C. Wagner and Paul L. Stern to Clinton Co., Clinton, Iowa. No. 2,150,197. March 14, 1939.

Air Passing Through an Enclosed Compartment Sterilized by Ultra-violet Rays During Passage From Inlet to Discharge Outlet—Jacques W. D. Chesney, Algonquin, Ill. to New Discoveries, Inc. Chicago, Ill. No. 2,150,263. March 14, 1939.

Potato Chips Deep Fat Fried While Passing Through Cooking Kettle in a Continuous Manner—Joseph D. Ferry, Harrisburg, Pa. No. 2,150,273. March 14, 1939.

Citrus Fruit Given a Waxy Coating and Placed in Storage While Still Wet—John R. MacRill, Whittier, Calif. to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,150,283. March 14, 1939.

Citrus Fruits Washed and Conditioned for Storage With a Waxy Coating Containing a Small Quantity of Pine Oil and Citrus Terpenes—John R. MacRill, Whittier, and Robert D. Nedvidek, Pomona, Calif. to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,150,284. March 14, 1939.